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COMPUTERWORLD

Inside

DATA CENTER UPDATE

As the pace of data center automation picks up, operations staff members struggle to adapt and carve out a solid career path. *Page 6*

PARALLEL PROCESSING

Unisys chose last week's **Cube and Use** user group conference to unveil the Extended Processing Complex, which was designed to guide systems through bottlenecks while providing high-performance parallel processing among 2200 systems. At the same time, **Convex** fleshed out its massively parallel processing strategy while strengthening its technical alliance with **Hewlett-Packard**. *Page 16*

OUTSOURCING

The promise of skilled help and savings motivates some users to outsource PC software support. *Page 63*. **ISSC** and its **Advantis** partner ink a $650 million pact with credit kingpin **Equifax**. ISSC will co-market Equifax services as part of the deal. *Page 12*

Rollouts could fire up net management plans

By Elisabeth Horwitt

Several major integrated network management rollouts planned for the next few months could prove to be the starting gun that triggers serious corporate implementations of enterprise network management systems.

Leading vendors are racing to respond to users who have demanded distributed, yet integrated, network management systems capable of managing the full gamut of network applications, devices and installation sizes.

Companies set to roll out products include the following:

- IBM is grooming NetView/6000 as a distributed enterprise manager able to manage Systems Network Architecture as well as internetworking installations. It will also be able to handle enterprise networks of a much higher order of magnitude than can the average Simple Network Management Protocol system, IBM spokesmen said (see story page 14). Availability is expected by year-end.
- Hewlett-Packard Co. is expected next week to announce OperationsCenter, which will extend its OpenView network management system beyond internetworking to encompass management of HP, IBM and Sun Microsystems, Inc. Unix systems. Also planned are remote procedure calls to support more dynamic communications between OpenView and managed systems, an HP spokesman said.
- HP and Ungermann-Bass, Inc. will announce a Unix-based version of NetDirector, UB's OS/2-based hub management system, that will be based on OpenView.
- NetLabs, Inc. is expected this

Net management, *page 14*

Sun opens Unix to Windows apps

WABI removes need for dual systems

By Jean S. Bozman
MOUNTAIN VIEW, CALIF.

Taking aim at the heart of Microsoft Corp.'s enterprise strategy for Windows NT, Sun Microsystems, Inc. is expected Wednesday to announce a software interface said to enable Windows applications to run up to 70% faster on Sun and other Unix workstations under the X Window System X11 standard.

Sun hopes that a successful interface will allow it to make inroads into Windows' installed base even as Microsoft launches Windows NT this spring. Windows NT will eventually allow users to run Unix applications from a variety of hardware platforms.

Sun plans to provide the interface free to users who buy Solaris before Jan. 1, 1994. However, Sun has not yet provided prices for the standalone software.

But there may be a wait for the Windows Application Binary Interface because "WABI," as it is called, could take a detour through the courts before users and developers get to see it in action.

In speeches to two user groups last week, Sun Chief Executive Officer Scott McNealy crowed about not having to pay royalties to Microsoft.

But a Microsoft spokesman said the company plans to respond to the concept of Windows on Unix next week.

WABI is a software interface that sits on top of Unix on workstations running the X Consortium's X11 interface. These include Sun workstations running the Solaris operating system, IBM's RISC System/6000s running AIX and Hew-

Sun, *page 10*

ALAN LEVENSON

Sun's Scott McNealy: *'We didn't pay a penny to the Evil Empire,' referring to rival Microsoft*

Wireless 'glue' stirs fury

By Joanie M. Wexler
NEW YORK

In a noble yet nebulous stab at fixing today's interoperability glitches among disparate wireless and wired networks, Motorola, Inc. last week officially unveiled its wireless "glue" technology, once code-named MoNet.

Meanwhile, a vehement dismissal of the interface by McCaw Cellular Communications, Inc., coupled with an industry divided as to how companies will actually use wireless communications during the coming decade, further thickened the wireless plot. It is one already muddled by incongruous protocols, a deficit of radio frequency-enabled applications, service coverage gaps and bandwidth and security limitations [CW, March 22].

"The wireless world is neither seamless nor transparent today," acknowledged Les Shroyer, corporate

Wireless, *page 15*

Drumroll, please

MOTOROLA'S 1993 DEPLOYMENT SCHEDULE FOR ITS MNI INTERNETWORK "GLUE" TECHNOLOGY:

IN PROGRESS
Beta test

JUNE
Public demonstration

JULY
Field test with selected end users

THIRD QUARTER
Product announcement

FOURTH QUARTER
Service for beta-test users

PC makers embrace Green Revolution

By James Daly

The brutally short product life cycles of many of the latest and greatest PCs and workstations have created one whopper of a high-tech headache: what to do with an estimated 10 million old computers that end up in the scrap heap each year.

A recent Carnegie Mellon University study estimated that as many as 150 million used computers will be piled in the nation's landfills by the year 2005. Disposal costs could reach $1 billion.

In an attempt to stem the tide of trash, hardware manufacturers IBM, Digital Equipment Corp., Hewlett-Packard Co., Apple Computer, Inc., AT&T and Xerox Corp. teamed up with the American Plastics Council last week to announce a major effort to reclaim plastics from computer carcasses (see box page 12).

"PCs should have much better destinations than the junk pile," said Michael Fisher, director of durable technology at the APC in Washington, D.C.

The process of sculpting the granulated remains of old PC

Green revolution, *page 12*

Plastic used in PCs can be reheated and reworked four or five times before the fibers in the material begin to lose their flexibility. Once exhausted, they can be used as plastic filler for other purposes.

Newspaper

Pacific Bell's Jennifer Lamarre found ways to gain the benefits of client/server without sacrificing the conveniences of legacy systems. Page 115

CINDY CHARLES

In this issue

CLIENT/SERVER

Moving from legacy systems to client/server poses enough of a problem that you can count the number of users integrating production environments "on your hands and feet," according to one analyst. *Page 112*

Experts describe the steps IS professionals can take to prepare for a career in a client/server world. *Page 129*

DATABASES

Attendees at last week's Sybase user conference learned that virtually all of Sybase's System 10 components have moved into beta testing and will ship by year's end. At an **Oracle** user meeting, CEO Lawrence J. Ellison leaked details about Oracle 8 and a forthcoming Oracle 7.1. *Page 8*. Separately, DEC talked up some new database releases of its own. *Page 2*

OPEN SYSTEMS

Open Vision Technologies, a new venture, is promising to bring mainframe-like command-and-control consoles to the world of open systems by year's end. *Page 8*

ENTERPRISE NETWORKING

IBM is repositioning NetView/6000 as an enterprise and SNA management system and plans also to provide SNA network reconfiguration without downtime. *Page 14*. **Motorola**, meanwhile, unveiled its own interface for developing distributed applications across disparate wireless and wired WANs but offered few tangible details. *Pages 1 and 15*

WINDOWS NT

Sun Microsystems this week will unveil an interface that runs Windows applications on X Window X11-compliant systems. *Pages 1 and 10*. **Microsoft**, meanwhile, begins to move to object-oriented environments for Windows with the delivery of **OLE 2.0.** *Page 4*

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Rdb update, gateway on tap

By Melinda-Carol Ballou

SAN FRANCISCO

■ Digital Equipment Corp. is expected this week to announce new versions of its Rdb database and will demonstrate a database gateway that will ship later this year.

While the new versions strengthen DEC's database and connections to other environments, some analysts questioned the company's corporate commitment to its own software.

Code-named DB Integrator, the gateway will allow users to transparently perform database joins across multiple platforms and databases, according to DEC sources.

Based on remnants of the company's defunct RdbStar technology [CW, July 17], DB Integrator will be able to use Rdb or other third-party databases (such as those from Oracle Corp., The ASK Group, Inc. or Sybase, Inc.) to store catalogs for determining where data resides and then to perform the joins, according to the sources.

Rdb 5.1, which is expected to ship next week, will provide multimedia enhancements, support for full-motion video and a driver for Microsoft Corp.'s open database connectivity, or ODBC. DEC's Accessworks will support Information Builders, Inc.'s EDA/SQL. DEC's Rdb Access services will offer read/write access to DB2 and Oracle, sources added.

DEC will also provide details of Rdb 6.0, which reportedly will support a quick-sort algorithm similar to one previously available only on IBM mainframe systems. Rdb 6.0 will also support stored SQL procedures and multithreaded restores. The product will not ship until the end of this year, however.

Rich Finkelstein, president of Performance Computing, Inc., a consultancy in Chicago, said the main advantage of a database like Rdb is how well-optimized it is for its environment and its administrative and development tools.

Finkelstein questioned DEC's commitment, however, to its own database. "I think this announcement is an attempt to resurrect Rdb, but unless DEC really wants to fight it out against the third parties like Oracle and Sybase — unless it wants to sell Rdb and not just hardware — it will always be behind," he said.

A DEC spokeswoman countered, "We're putting significant resources into Rdb and will be marketing it very aggressively. At the same time, we want to give customers [a choice] of databases."

DEC eyes simplicity with revamped service plans

By Melinda-Carol Ballou

MAYNARD, MASS.

Responding to competition and user pleas, Digital Equipment Corp. is revamping its service offerings and streamlining business practices to simplify customer access to services.

This process is expected to be finalized and announced by the fall and will result in new pricing and a leaner portfolio of service offerings, according to DEC sources.

"Before, for instance, we would offer different versions of the same service contract for DEC and non-DEC platforms," a DEC source said. "One goal of this reorganization is to offer one flavor [of service contract] for multivendor platforms."

DEC now bases prices on the particular products that are serviced. Under the new structure, pricing would be based on the actual services required by users, the DEC source added.

DEC officials refused to elaborate.

Customer gripes

Some DEC users have been disgruntled by a range of service issues — everything from poor management of maintenance contracts to the blaming of local service representatives for problems occuring at higher levels, according to discussions on DECUServe's user network. The revamping of the service organization is welcomed by many — assuming that user input is effectively solicited, according to members of the Digital Equipment Computer Users Society (DECUS).

"They need to streamline because the service offerings and business practices they use now are just too complicated and confusing," said Ta Fuh Chiam, services issue manager for DECUS' Business Practices Special Interest Group. "To get DEC to do anything, you have to go through a lot of bureaucracy. They seem more interested in internal control with multiple layers of administration than in responding to customers."

Analysts said that upcoming price wars in the service industry require simpler methods of doing business. They also noted that DEC has a major job to complete as it forges ahead. Sun Microsystems, Inc., IBM and Hewlett-Packard Co. recently revamped their service offerings, for instance [CW, April 12].

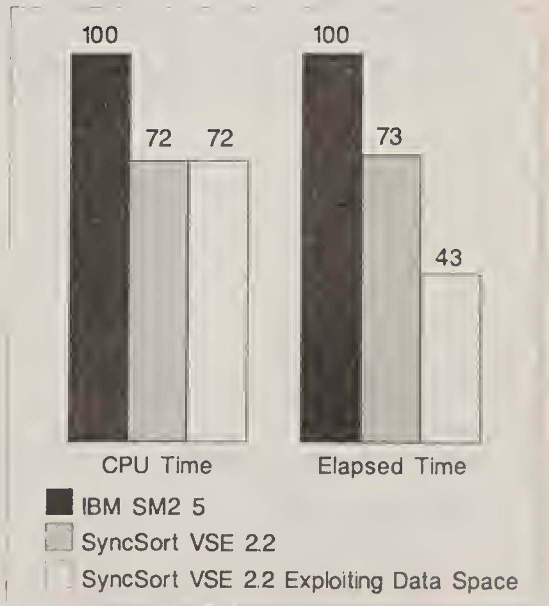
From roughly 200 different service offerings, DEC is reportedly trying to reduce the number of offerings to 10 (the number is currently at about 25).

"We have heard some people say that [DEC's] prices are high, but it's good for what you get, and other vendors are doing a worse [service] job than DEC," Chiam said. "But what does charging people based on what they use actually mean? It's hard to form an opinion right now."

Corrections

- A story on Series/1 migration in the April 19 issue incorrectly cited the name of Computer Information Enterprises, Inc. in Tustin, Calif.
- A news brief in the April 19 issue may have left the impression that Version 2.0 of Walker Interactive's financial application software, which will support Windows and Presentation Manager, is already available. The product is not expected to ship until the fourth quarter.

HERE'S WHERE WE LEAVE THE COMPETITION.



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Conferencing app aids interactive links

Groupware package lets up to eight users view screen simultaneously

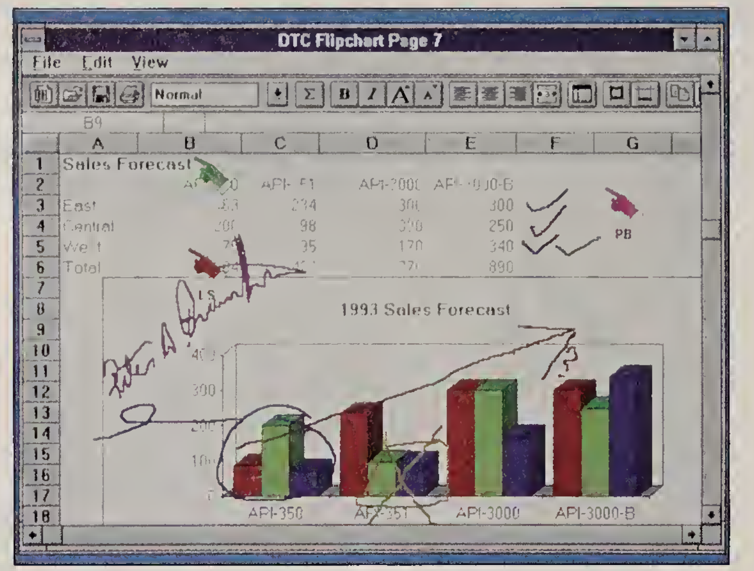
By Michael Vizard
STAMFORD, CONN.

Looking to take the concept of groupware to its next logical level, Fujitsu Networks Industry, Inc. this week will unveil a peer-to-peer conferencing application that allows users to simultaneously view and share the same Windows application across a Novell, Inc. NetWare network.

Unlike existing groupware applications that do not support live interactive links, Fujitsu's Desktop Conferencing software lets up to eight users view the same application while talking on the phone.

"Anything you can do in Windows we can support. We can turn any software into groupware," said Jim Zimmerman, director of marketing for Fujitsu's communications systems.

"This is live. That's its big differential as a groupware product," added Michael Heylin, a senior associate at Creative Strategies Research International, Inc. in Santa Clara, Calif. "What this adds is a real-time capability that isn't in something like Lotus Notes," he said.



Fujitsu's Desktop Conferencing *software reflects on the participants' screens updates made by the group chairman*

For example, Global Marine, Inc., an offshore drilling company in Houston, has adopted the Fujitsu software as part of an effort to cut down on trips to Aberdeen, Scotland, said Rob White, director of MIS technical support.

Global Marine is moving from a mainframe to a client/server environment based on a Novell wide-area network. The Fujitsu software trains users in Aberdeen how the new client/server applications work, White said. "We have about 32K bit/sec. available for data on our network, and it takes about 10 seconds to repaint an entire screen."

He said Global Marine expects to use the Fujitsu software to let managers review spreadsheets, contracts and proposals without traveling to Aberdeen. "In a spreadsheet application, the Fujitsu software allows you to change a cell value without having to repaint the entire screen," White said.

As a software-only solution, the Fujitsu offering essentially extends the NetWare architecture by adding real-time capabilities on top of Novell's IPX protocol. After setting up the initial conference, the designated chairman controls the application, while other members of the conference are designated participants. The chairmanship can be switched at any time.

Because each user is viewing the same screen, the chairman's updates are reflected automatically on the participants' screen.

The software includes support for a light pen interface to make handwritten notes on screens, a flip chart function for presentations, a text-messaging feature for sending notes to a specific member of the conference and a file-transfer utility.

"Right now, there is a lot of interest in desktop videoconferencing, but I think this may be more useful in the short term because it's application conferencing. It doesn't have the same political issues that are associated with telecommunications systems," Heylin said.

Pricing for the Fujitsu groupware product starts at $2,475 for a five-user pack. A light pen pack costs $395.

Microsoft gets object-oriented with OLE 2.0

By Michael Vizard
TYNGSBORO, MASS.

Microsoft Corp. last week began shipping Version 2.0 of its Object Linking and Embedding (OLE) protocol for Windows, heralding a new storage format that will consolidate a large number of the application programming interfaces (API) that Windows developers are currently required to master.

OLE 2.0 is Microsoft's initial effort to create an object-oriented environment for Windows that will simplify application development by consolidating APIs into a collection of objects.

"The APIs in Windows today tend to be ambiguous and badly named functions," said Kraig Brockschmidt, a software design engineer at Microsoft.

The arrival of OLE 2.0 coincides with Lotus Development Corp.'s delivery of its API for Notes. Lotus has delivered its Notes API to both Microsoft and WordPerfect Corp. as part of an effort to better integrate non-Lotus applications with the Notes database.

Microsoft plans to provide a network-aware remote procedure call that will link objects across systems.

Also, Microsoft and Lotus are working together to create compatibility between OLE 2.0 and the object-oriented storage format specified in Notes. "We're working closely with Microsoft to make sure we can access the storage formats in OLE 2.0 so that applications can launch each other. This will not be a VIM vs. MAPI type of issue," said Alex Morrow, general manager for cross-platform architecture development at Lotus.

From Microsoft's point of view, cooperating with Lotus will help ensure that sites adopting Notes will not automatically adopt Lotus applications that are better integrated with Notes.

In general, OLE 2.0 provides a more robust set of objects for Windows that Microsoft expects will become the preferred method for linking applications because it provides a superset of the functions found in Dynamic Data Exchange, File Manager drag-and-drop protocols, OLE 1.0 and the Windows Clipboard.

"OLE 2.0 is a direction that all developers will have to follow. Users usually have one primary application they work from, and then they launch other applications as they need them," noted Said Mohammadioun, vice president of Lotus' Word Processing and Advanced Spreadsheet Division.

Speaking at the International Windows Developer's Conference sponsored by Boston University here, Brockschmidt said OLE 2.0 consists of three primary objects: Allocator Objects, Storage and Stream Objects and Data Objects. Instead of using 11 APIs to access local memory or 21 APIs to access global memory, programmers will be able to address objects to handle memory management, he said.

OLE 2.0 for Windows NT and Apple Computer, Inc.'s Macintosh is due later this year.

Major distribution channel

Choices, lower cost foster CD-ROM use

By Michael Fitzgerald

Software on CD-ROM looks poised to become a major distribution channel, bringing with it lower prices and more application choices.

Last week, Ingram Micro, Inc. said it would follow Boulder, Colo., distributor InfoNow Corp. into the market for CD-ROM software distribution. Analysts said Merisel, Inc. and Tech Data Corp. are likely to follow suit.

And Apple Computer, Inc. is expected to begin aggressive CD-ROM distribution, accompanied by sharp price-discounting for applications, sources said. Apple declined comment.

"The cost of doing a CD at this point is certainly less than putting 10 diskettes in a box," said Will Fastie, an independent industry consultant in Baltimore.

Chevron Corp. expects to save millions by getting software from InfoNow [CW, Feb. 22].

Other factors contributing to the CD-ROM software distribution movement include the following:

- Novell, Inc.'s NetWare 4.0 comes on CD-ROM, and Microsoft Corp.'s Windows NT will require CD-ROM to run.
- Software packages are growing in size, and CD-ROM drives are declining in price.
- Software vendors can gain copy protection.

Users also like the idea.

"We're incredibly interested in [distributing applications via CD-ROM]," said Irene Kirk, global office technology integrator at Pepsico, Inc.'s Pepsi-Cola International division.

Officials at Santa Ana, Calif.-based Ingram Micro said they do not expect CD-ROM to garner more than 15% of volume.

Fastie said, "You'll know CD-ROM has arrived when a hardware manufacturer puts drives into their product line."

That time is approaching as vendors push multimedia PCs. IBM PC Co. intends to ship all of its PCs with CD-ROMs by late 1994.

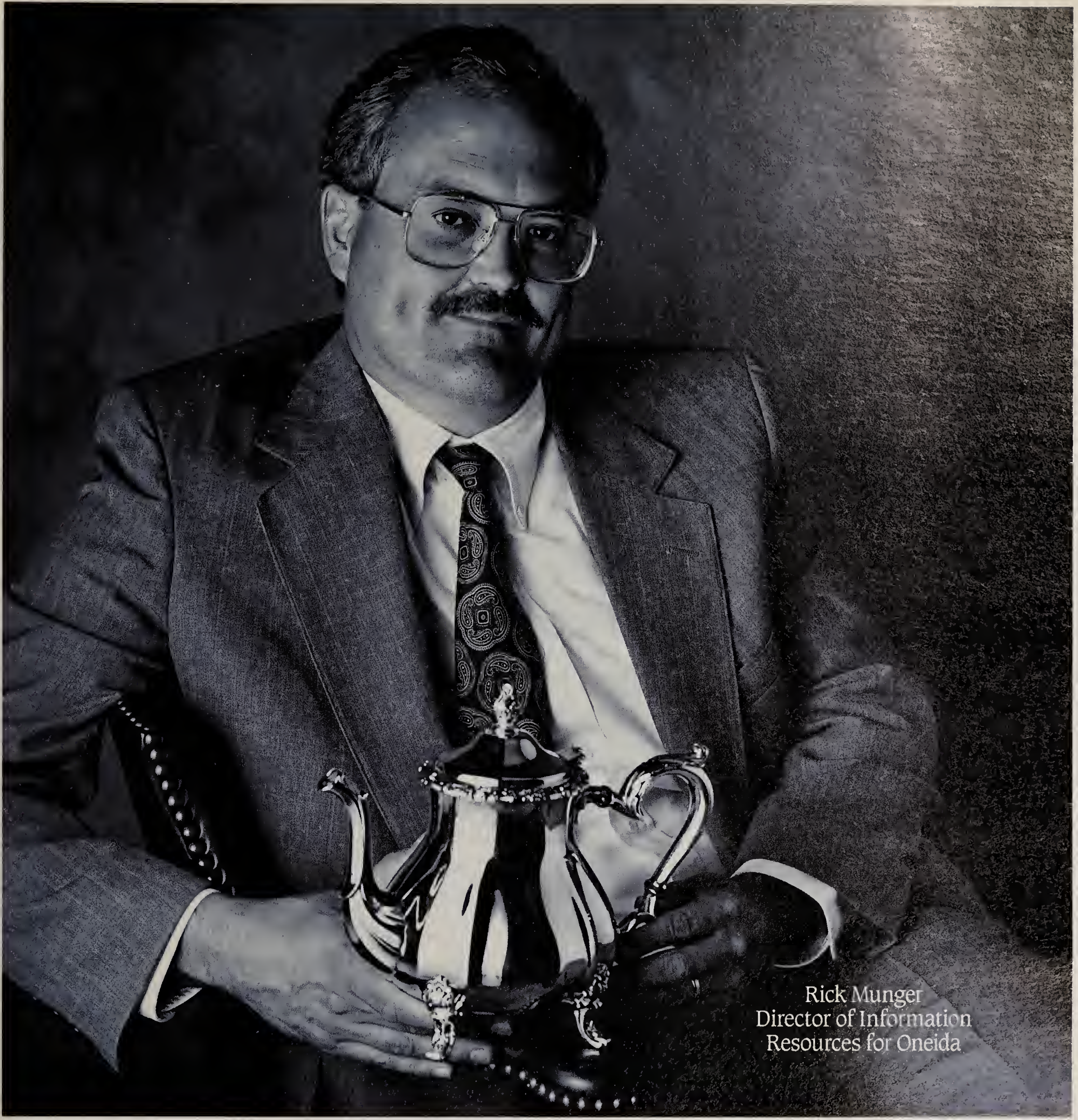
Gateway 2000, Inc. already builds CD-ROM drives into local bus versions of its 33/66-MHz DX2-based systems and may put the drives into other local bus models, according to Mike Schmith, Gateway's marketing manager.

"By 1996, no PC will be considered a complete system without CD-ROM," said Patty Chang, senior analyst at Dataquest, Inc., a San Jose, Calif., market research firm.

Still, bugs need to be worked out. Sheldon Laube, national director of information technology at Price Waterhouse and an early adopter, said software vendors are working on problems such as a limit on the types of characters a disk will recognize.

Easy Access

Under Ingram Micro's CD Access project, up to 200 encrypted applications will go on a single CD-ROM disk. Ingram Micro will encourage its resellers to hand out the disks to PC buyers. Dave Eliasberg, CD Access project manager, said Ingram Micro expects its product to give users access to software from both big and small vendors. Users can call an 800 number to exchange their credit card numbers for an application's encryption code.



"When we decided to downsize, I was pleasantly surprised to see that CA's a leading AS/400 software vendor. The fact that they offer the leading AS/400 manufacturing and warehouse software made it much easier for us. It's always better to go with somebody you already know and trust."

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News Shorts

Costs cause Wang $87.2 million loss

Restructuring charges, tight margins and lower sales figures combined to hand **Wang Laboratories, Inc.** an $87.2 million net loss for its third quarter, ended March 31. Third-quarter revenue fell from $460.8 million in 1992 to $294.8 million this year, leading to an operating loss of $17.5 million for Wang. That loss was compounded by restructuring charges linked to Wang's bid to escape Chapter 11 bankruptcy court status.

Message tool added to SoftBench

Hewlett-Packard Co. upgraded its SoftBench Unix application development framework, adding a previously announced SoftBench Message Connector. The connector was designed to let users adapt development tools from different vendors to exchange software-building information without fiddling with underlying source code. SoftBench 3.2 is priced at $2,300 for a C language version and $4,500 for C++. Current users can get the upgrades for free.

Stac, IIT resolve suit

Stac Electronics, Inc., has settled a software patent infringement suit filed against **Integrated Information Technology, Inc.** (IIT). IIT has admitted that its XtraDrive software, XtraDrive Plus Hardware and DCP compression processor chip infringe on Stac's patents, and it will purchase a royalty-bearing license. The patents in question are still the subject of a suit between Stac and **Microsoft Corp.** concerning Microsoft's DoubleSpace data compression utility in MS-DOS 6.0.

Certification for resellers

PC resellers, whose ability to provide service is questioned in proportion to the complexity of PC technology, were offered a new certification program designed to allay such inquiries. **ABCD: The Micro Computer Industry Association** announced its A+ certification program, which is supported by **IBM PC Co.**, **Apple Computer, Inc.**, **Compaq Computer Corp.**, **HP** and others.

Intel goes after AMD

Intel Corp. has sued **Advanced Micro Devices, Inc.** for copyright infringements relating to newly issued AMD486 clones. The suit also covers AMD's unannounced clean-room-developed 486 clones. AMD said the suit was "not unexpected" and that it expected to win in court.

SHORT TAKES IBM Vice Chairman Jack D. Kuehler announced his retirement after 35 years with the company. . . . **The Santa Cruz Operation** said it plans an initial public offering of 6 million shares of common stock in mid-May, expecting to bring a price of $14 to $16 per share. . . . With its hardware business winding down, **Next, Inc.** last week announced that as of May 15 Bell Atlantic Business Systems Services will assume responsibility for servicing all Next workstations and printers under warranty in the U.S. . . . The **IBM Personal Software Products Division** is moving its headquarters from Somers, N.Y., to Austin, Texas. . . . Manufacturing and financial software maker **Platinum Software Corp.** in Irvine, Calif., signed an agreement to buy **Cypher Business Systems Ltd.** in Cheshire, England, which provides Ergo distribution industry software. . . . Despite an operating profit of $336,000, **Sequoia Systems, Inc.** reported a net loss of $3 million after taking a charge for settling a class action suit.

News shorts, *page 16*

Automation picks up pace

Faced with job loss, data center managers reevaluate careers

By Johanna Ambrosio

DALLAS

The speed of data center automation is picking up, analysts said, primarily because of continuing mergers and the quest for distributed computing. Meanwhile, people who work in these data centers are struggling to cope as best they can.

These and other related issues were at the forefront of discussions among the more than 2,000 users and vendor representatives who gathered at the Association for Computer Operations Management (AFCOM) annual conference last week.

On the whole, there was a lot less "techie talk." Operations staff members instead swapped information about how to adapt to an industry in which their mainframe-oriented skills are less in demand.

Making matters more frightening for them is the quickening pace of automation. "The companies [that] sat back and waited are now jumping in," said Arnold Farber, a principal at consulting firm Farber/La Chance, Inc. in Richmond, Va. "The second wave has started."

Industry trends of corporate downsizing, consolidation and distributed computing are very much fueling the speed of data center automation, said Igor Stenmark, an analyst at Gartner Group, Inc. in Stamford, Conn.

At the Daughters of Charity, a not-for-profit health care provider, the automation rollout started in March 1992. "I'd like to say we're done, but we're not," said T. Scott Culiver, operations manager at one of the organization's major data centers in Evansville, Ill.

The biggest problem Culiver's staff ran into was a lack of PC expertise. As they brought in PCs to help manage multiple platforms from a central location, "we did not have a PC guru to assist us," Culiver said. That has now been addressed.

But the most pernicious issues surrounding automation are human ones, most observers said.

"I'm really afraid that a lot of our members are not prepared for these changes," said Len Eckhaus, AFCOM president. "Traditionally within the data center, people perceive themselves in terms of how big the equipment is and how much of it there is. That is no longer the case."

If you can't beat 'em . . .

Most practitioners agreed that the more successful data center people — those who keep their jobs and continue to advance in the company — are those who accept downsizing, consolidation and distributed computing as unstoppable industry forces. And instead of trying to fight the inevitable, practitioners suggested approaching change as a chance to learn new things and help companies by providing better service.

As more client/server applications are implemented throughout corporate America, one primary data center task will be to look after the quality of response time throughout the far-flung network.

"I know a lot of my people worry," said Kenneth Stedtfeld Jr., data center manager at Hexcel Corp., a manufacturing firm in Pleasanton, Calif. "I try to encourage a new way of thinking, and I try to assure them that they will be part of the new environment."

Hexcel adopts a lights-out environment during the weekend, where the system remains accessible to end users, and operators are paged if anything goes wrong.

In addition, Stedtfeld's staff has reduced floor space requirements for disk storage gear by more than 20%, while increasing the total amount of storage capacity by swapping older technology for a smaller, more current model. The staff has also improved response time, from an average of 4.5 seconds to an average of 2 seconds, by adding more memory.

All the while, Hexcel's information systems department has gone from a high of 40 people to its current level of 27.

Morris Polston, manager of computer operations at Miles, Inc. in Elkhart, Ind., said his philosophy is: "For every threat, there is an opportunity for mainframe and glass-house people to leverage their training." He and his staff will test that motto when the Elkhart data center merges with one in Pittsburgh later this year.

IBM seeks to solve SNA downtime

By Elisabeth Horwitt

ARMONK, N.Y.

IBM last week began shipping a product said to eliminate the need to take SNA networks down every time the Network Control Program tables on the front end need to be reconfigured.

With Fast Network Reconfiguration RPQ, users can keep their Systems Network Architecture (SNA) networks running 24 hours a day, 7 days a week, IBM said. And they do not need to migrate to IBM's Advanced Peer-to-Peer Networking (APPN) protocol to achieve this dynamic configuration.

However, there is one caveat: The product works only on a high-end 3745 front-end processor with dual channel control units (CCUs).

"This seems like a brute force hardware solution to a software problem; IBM is requiring people to spend more money on their aging 3745s," said David Passmore, a vice president at Gartner Group, Inc. in Stamford, Conn.

The price — it costs about $70,000 to upgrade a 3745 with a second CCU — could make the product a less attractive stopgap solution for pre-APPN customers.

According to IBM, however, 55% to 60% of its customers with high-end 3745 models have dual CCUs. And users require only one such model per SNA network in order to use the feature, an IBM spokesman said.

Covia Partnership originally suggested the idea of Fast Network Reconfiguration to IBM and became the first user of the product.

"In mid-1992 through first-quarter 1993, Covia has been working on a project called continuous operations," said Anthony J. Giardullo, manager of network systems development at the Apollo computer reservation system.

"We are raising the bar to close to 100% uptime" in order to provide continuous service to some 50,000 Covia users, including travel agents, he added.

Covia used to take its network down for a network generation every six weeks for five to 15 minutes, Giardullo said. With IBM's product, the company can make network generations with little or no user impact.

The product allows users to implement Network Control Program table changes on one CPU, while the other handles all SNA traffic. Once the changes are finalized, they can be implemented in less than a minute — fast enough not to terminate SNA sessions, IBM said.

Pricing for Fast Network Reconfiguration RPQ is $9,000.

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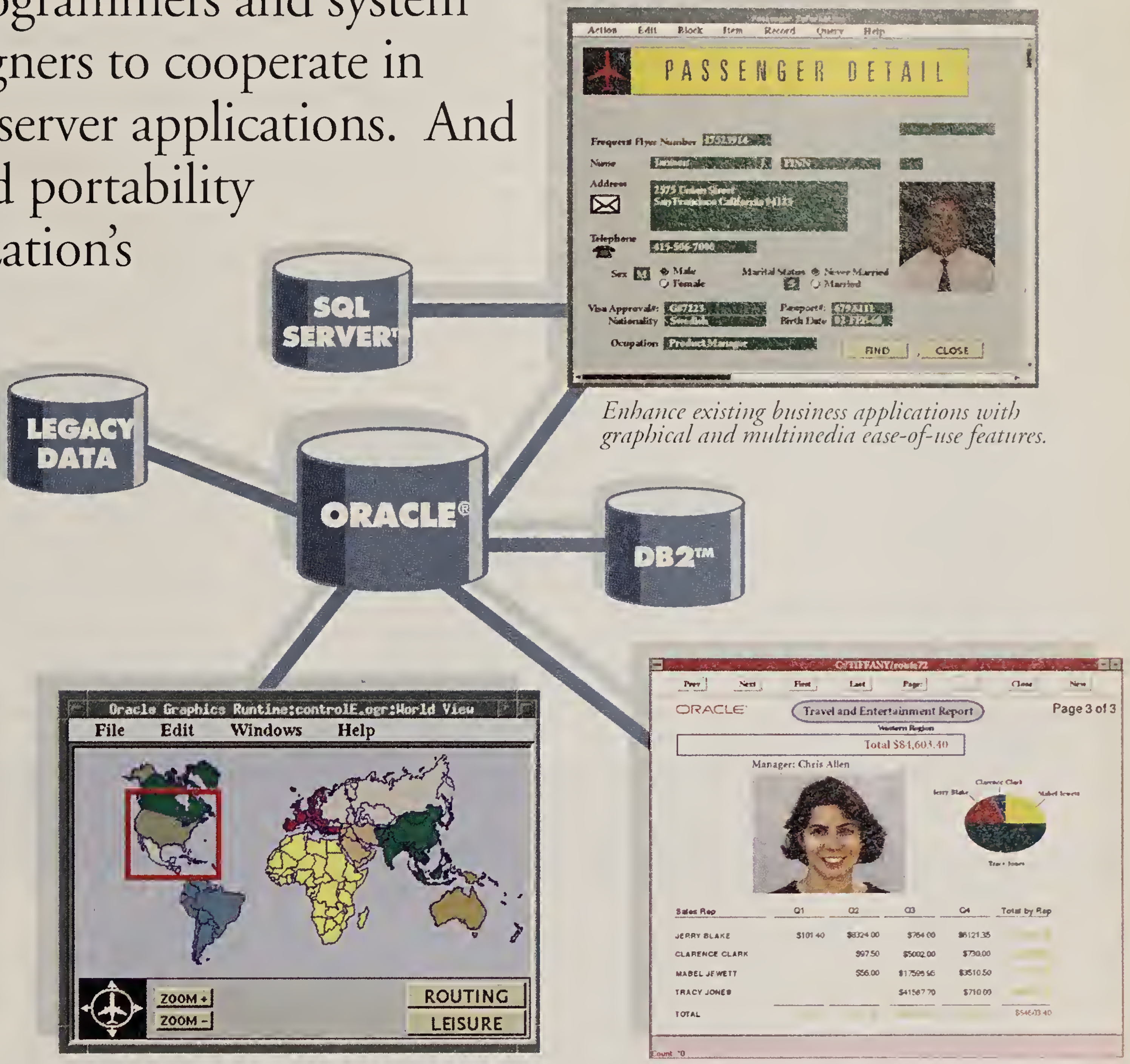

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Name
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Marital Status ● Never Married ○ Married
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JERRY BLAKE	$101.40	$8324.00	$764.00	$6121.35	[illegible]
CLARENCE CLARK		$97.50	$5002.00	$730.00	[illegible]
MABEL JEWETT		$56.00	$17595.56	$3510.50	[illegible]
TRACY JONES			$41567.70	$710.00	[illegible]
TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	$54603.40

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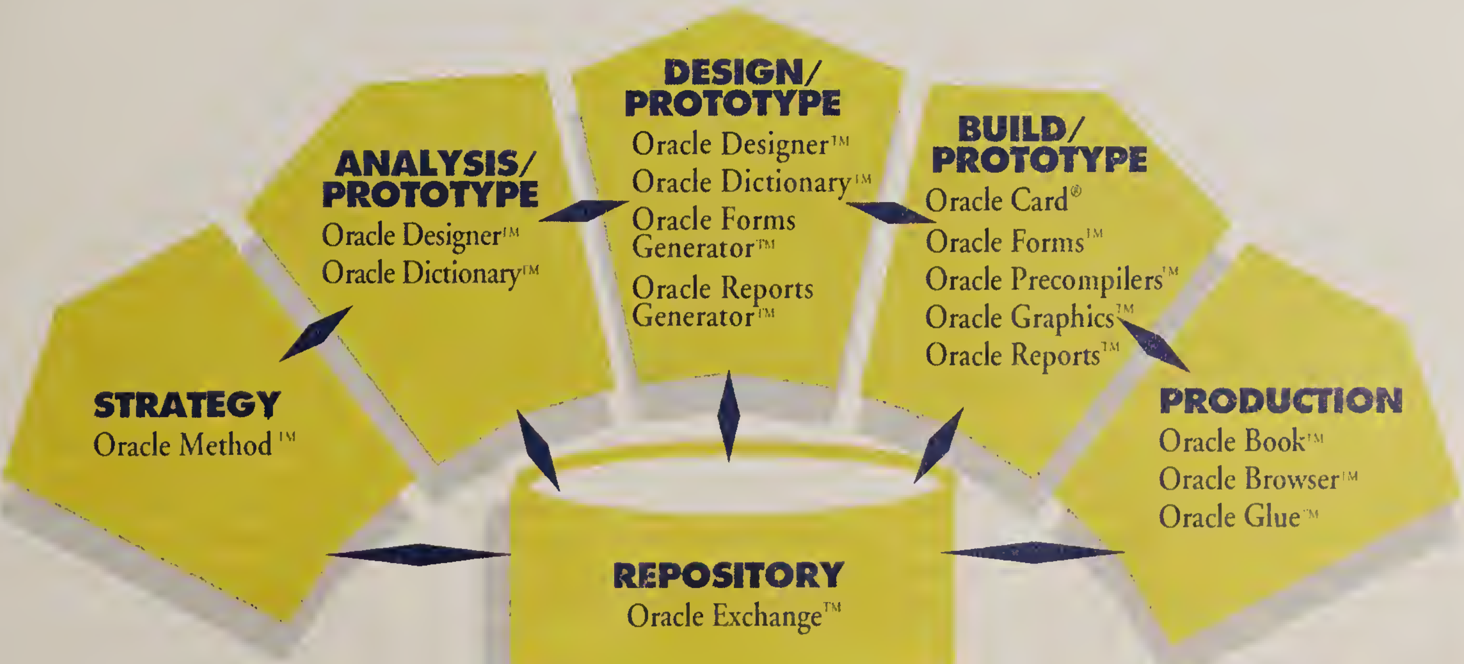

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ORACLE

Next Sybase migration outlined

Completed System 10 line to ship by year's end

By Jean S. Bozman
SAN JOSE, CALIF.

Users said they anticipate a smooth transition later this year from Sybase, Inc.'s current database to System 10, now that eight of the 11 components in System 10's distributed database server line have reached the beta-test stage.

Further fueling those expectations was a report from Stewart Schuster, Sybase marketing vice president, who told a Sybase user conference last week that all System 10 modules will be shipped by year's end. A related tools announcement is slated for June, he added.

In addition, one System 10 module, OmniSQL Gateway, a tool that allows accessing many brands of databases, has already shipped [CW, April 12].

Among the modules undergoing tests at user sites are the Backup Server, the enhanced SA (System Administration) Companion system monitors and the enhanced versions of the firm's Open Server and Open Client application programing interfaces (API).

Still, the year-end shipment schedule could be tight. That is because Sybase said the Replication Server 10 for distributing database updates and the Navigation Server 10 for parallel processing SQL queries — both key elements of System 10 — will not enter beta-test sites until later this year.

The chief attractions of System 10 are its administrative utilities, which address backup, system administration and data distribution across an enterprise network [CW, Nov. 9]. It will compete with Oracle Corp.'s Oracle 7 (see story page 145).

"The product set fills in the gaps in the client/server infrastructure," said Myke Miller, a consultant at Andersen Consulting's Minneapolis office who designed Sybase applications for Northwest Airlines. "You sort of had to get by without this stuff before."

Some users said they expect a fivefold speedup in backup and recovery procedures using the Backup Server, a component that will be bundled with System 10. Backing up a multigigabyte database can take hours with existing Sybase systems, and recovery can take just as long, users said.

Moving ahead without it

Some of the users attending the fifth annual Sybase conference said they could not wait for System 10's arrival and are building new client/server applications with Sybase SQL Server 4.9.1, Sybase's current release.

"We can't afford to put System 10 as a milestone on our schedule because our client has a hard deadline," said Richard Esposito, a senior systems architect at Zyga Corp., a federal contractor in Columbia, Md.

"We could migrate to System 10 capabilities after we put in the Sybase [SQL Server 4.9] database," Esposito said. He said he does not expect any conversion problems and anticipates that he could add System 10 features to the application.

Pricing for the Sybase SQL Server 10 ranges from $2,000 to $256,000, depending on computer platform and number of users; many System 10 components, including the database server, are available as maintenance upgrades.

Ellison talks up Oracle Version 8.0

By Jean S. Bozman
BURLINGAME, CALIF.

Oracle Corp. developers who expected nonstop talk about migrating to the just-released Oracle 7 and related development tools at their annual conference here were surprised to find Oracle Chief Executive Officer Lawrence J. Ellison once again chatting about the firm's unfinished Version 8.0 database.

Ellison *is already focused on Oracle 8*

Speaking off-the-cuff to Oracle developers, Ellison said Version 8.0, a relational database with object-oriented features, would be announced by December 1994, two years after shipment of Oracle 7.

He said Version 8.0 will feature object-oriented extensions to SQL, a new object schema layered over the Oracle 7 database and server support for multimedia.

Ellison promised an interim release, Oracle 7.1 with parallel-query support, to be announced in October, and he reviewed Oracle 7 tools shipment slated for June.

Also on the agenda was migration to object tools. Oracle, which just upgraded its character-based development tools to graphical user interface tools, will have to change them yet again into object tools, analysts noted. Ellison said that even the company's computer-aided software engineering tools will have to become object-oriented.

"We want something that can take you from the relational world to the object world gracefully and with 100% upward-compatibility," he said. "We'd like to make Oracle 8 as easy to administer as the [Apple Computer, Inc.] Macintosh file system."

Some users questioned Ellison's emphasis on Oracle 8 just as Oracle 7 is becoming a reality. "I appreciate him sharing his vision of Oracle 8, but what's significant is that some of the Oracle 7 stored procedures and packages can be used to prototype the object-oriented interfaces of the future," said Mark Whitney, president of SoftNet Corp., a consultancy in Armonk, N.Y.

Microsoft, D&B align on NT applications

By Melinda-Carol Ballou
FRAMINGHAM, MASS.

Microsoft Corp. last week added to its recent spate of technical alliances by announcing an agreement with Dun & Bradstreet Software that will produce jointly developed D&B Software products for Microsoft's Windows NT operating system.

Eager to bolster its client/server efforts, D&B Software will resell Microsoft's Access database as an embedded tool for its SmartStream decision support products. Microsoft will beta-test D&B Software's SmartStream for internal use. Microsoft recently announced alliances with Computer Associates International, Inc. and Compaq Computer Corp.

Users were enthusiastic about the D&B Software relationship.

"This is important to us for a couple of reasons. We are closely tied to D&B, and we have also set Microsoft products as a strategic direction," said Karen McKemie, director of financial information systems at Enron Corp.

Enron is in the process of setting up SmartStream client/server products for a site with 1,200 financial system users.

"We're using Access to do all our ad hoc reporting, and it's critical to us," McKemie said. "We previously used a mainframe-based tool supplied by D&B called Info-Expert, but it wasn't meeting our needs. You had to be an analyst/programmer to be proficient."

Some analysts questioned the Access database's adequacy as a client/server front-end tool.

"It's a good desktop platform, but it wasn't designed for client/server and doesn't support the back-end servers. It has poor performance and questionable multiuser support," said Rich Finkelstein, president of Performance Computing, a market research firm in Chicago.

D&B Software's SmartStream product manager Gail Goodman answered: "We've had very acceptable performance with reasonably large data sets."

Other analysts said the announcement was a strong one for both companies.

D&B Software's revenue in the first financial quarter grew roughly 1.5% for its marketing information services but decreased 5.6% for software services due partly to divestiture of its Information Associates Division.

"It's very good news for D&B, bringing the kind of backing they needed for SmartStream and work-flow products, and it's good for Microsoft to gain access to D&B's installed base," said Jennifer Schols, an analyst at International Data Corp., a market research firm in Framingham, Mass.

"Microsoft gains an insight into a leading-edge client/server product development effort and into what is required for operating systems and tools functionality," added Peter Kastner, a vice president at Aberdeen Group, a market research firm in Boston. "Working with Microsoft will yield a superior product for D&B, who is behind some of their competitors but ahead of their customers in that they are just now grasping the opportunities for enterprise downsized [decision support systems]."

D&B Software, he continued, is "marching to its own drummer." The company is rolling out its decision support system component infrastructure first, to be followed later by transaction processing applications. PeopleSoft Corp. has released some client/server applications already, and SAP AG and The Dodge Group will roll out their applications later this year.

Systems management

Start-up offers tonic for open systems control

By Jean S. Bozman

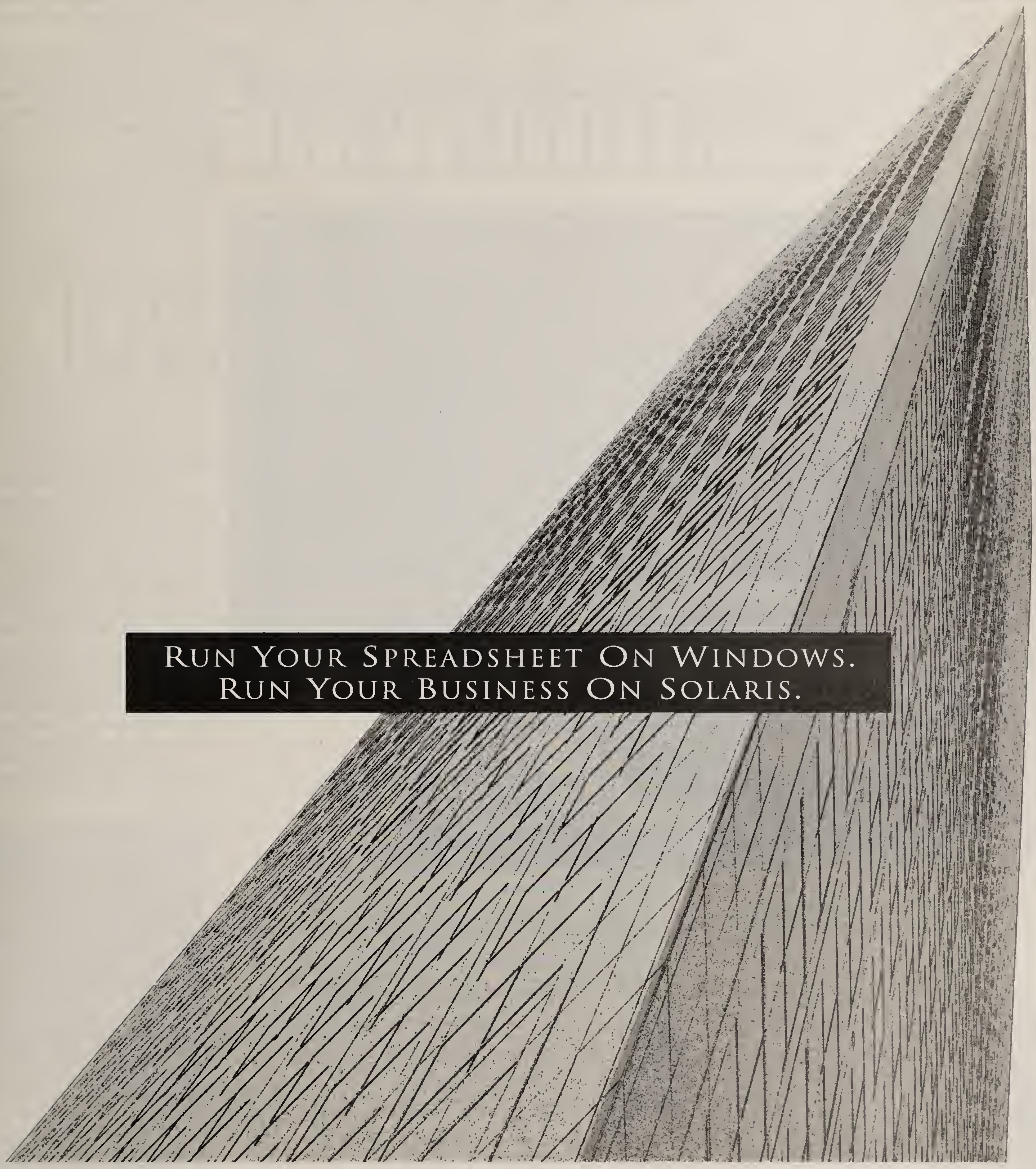
A start-up founded by a former Oracle Corp. executive promised last week to bring mainframe-like command-and-control consoles to the open systems world by year's end.

Michael S. Fields, who exited Oracle last year after heading up its U.S. sales division, started Open Vision Technologies, Inc. with $25 million in funding from Warburg, Pincus Ventures, Inc. His strategy is to build an integrated systems administration tool to control operating systems, networking and multiple databases.

The New York company will be based on technology acquired from a constellation of smaller firms. The final product, called OpenVOPSS, is slated to ship by year's end, Fields said.

To date, the Pleasanton, Calif., firm has acquired several companies and their software products in areas such as archiving, security, job scheduling and backup. An engineering team headed by former Amdahl Corp. and Ingres Corp. software designer Asa Lanum is writing custom code to bind the separate Open Vision utilities into a single console system.

Industry analysts said the task of providing a seamless environment could prove daunting, as could competing directly with Computer Associates International, Inc.'s CA-UniCenter product [CW, April 26].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Sun opens Unix to Windows applications

CONTINUED FROM PAGE 1

lett-Packard Co.'s Precision Architecture-RISC machines running HP/UX.

WABI will let users "run your [PC] legacy applications on Windows and run your business on Solaris," McNealy said in an address at an Oracle Corp. developers conference held in Burlingame, Calif., last week.

WABI is targeted mostly at information systems managers who want to distribute application software evenly to both Unix and PC client machines.

Sun users attending Oracle and Sybase, Inc. user conferences said WABI could reduce their cost of computing by allowing them to have just one computer instead of a workstation and an Intel Corp.-based PC on their desktops. Some said they have been running Windows applications in an emulation mode on Sun workstations — a costly option.

Moreover, the emulation approach adds to system overhead by forcing users to run their Windows applications on top of Unix and DOS, a Sun spokesman acknowledged.

McNealy has "been telling us about putting these great Unix boxes on our desks, but we've had to pay megabucks for a word processor," said Teri Iaconis, manager of database consulting services at Computer Task Group, Inc.'s San Francisco office.

McNealy said he clearly expects that WABI, based on technology gained from the 1992 acquisition of Praxsys Technologies, Inc. in Norwood, Mass., will provoke the legal attention of his desktop rival, Microsoft.

"We didn't pay a penny to the Evil Empire," he quipped, referring to Microsoft royalties for Windows products. "We probably spent more on lawyers on this product than we have on engineering." But Sun engineers will still have to test individual Windows applications to certify them for WABI support, McNealy said.

Watchful eye

Microsoft, meanwhile, is "not looking to start something, but once we see what they have and whether or not it works, we [may] have to protect our intellectual property rights," said Microsoft spokesman Collins Hemingway.

Hemingway also noted that Windows will change with the introduction of Windows NT next month — and Version 2 of Windows' Object Linking and Embedding technology (see story page 4). "It's a moving target, and it's going to be extremely difficult for them [at Sun] to promise that they'll be able to keep up with us over the next six, nine, 12 or 24 months," he cautioned.

Tim McCollum, senior vice president of research at Dean Witter Reynolds, Inc., said Sun is pushing WABI as a better mousetrap than the standard combination of Windows and PCs.

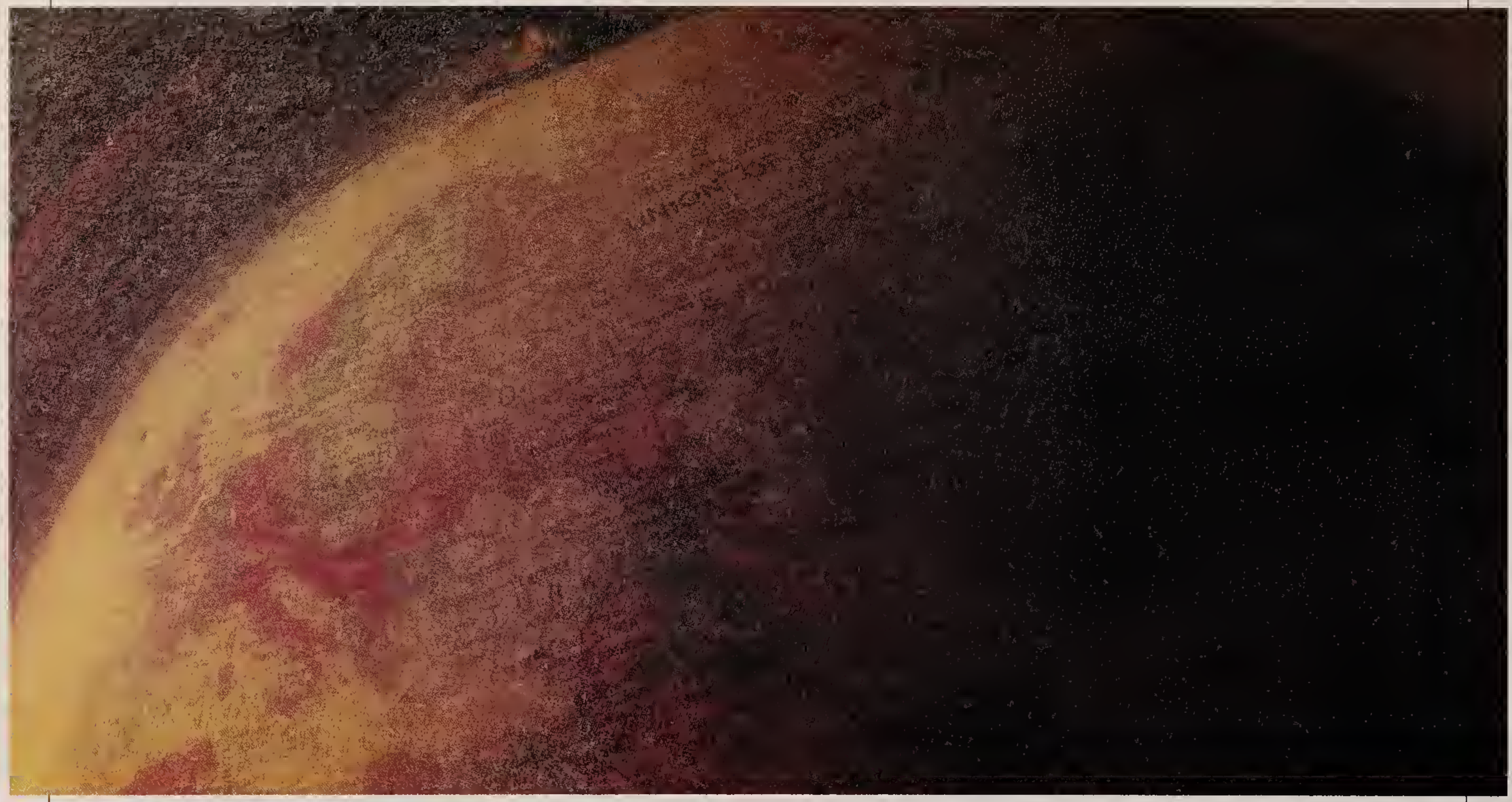
"It's the speed because you're running Windows on a faster processor," McCollum said.

API loyalties

The arrival of Sun's WAPI specification is the first maneuver in what is expected to become a high-stakes gambit for the loyalties of application developers.

Software providers report that Apple Computer, Inc. has lined up Novell, Inc. for its Exemplar object linking technology, which will ultimately lead to a common API for writing and launching applications across Macintosh and Novell platforms.

Developers are also waiting to see if Microsoft will counter Exemplar by endorsing WAPI or by extending Object Linking and Embedding (OLE) and its Windows API to Unix. Microsoft has previously said it will deploy OLE on top of Windows APIs for Windows, Windows NT, Macintosh and Unix systems. —*Michael Vizard*



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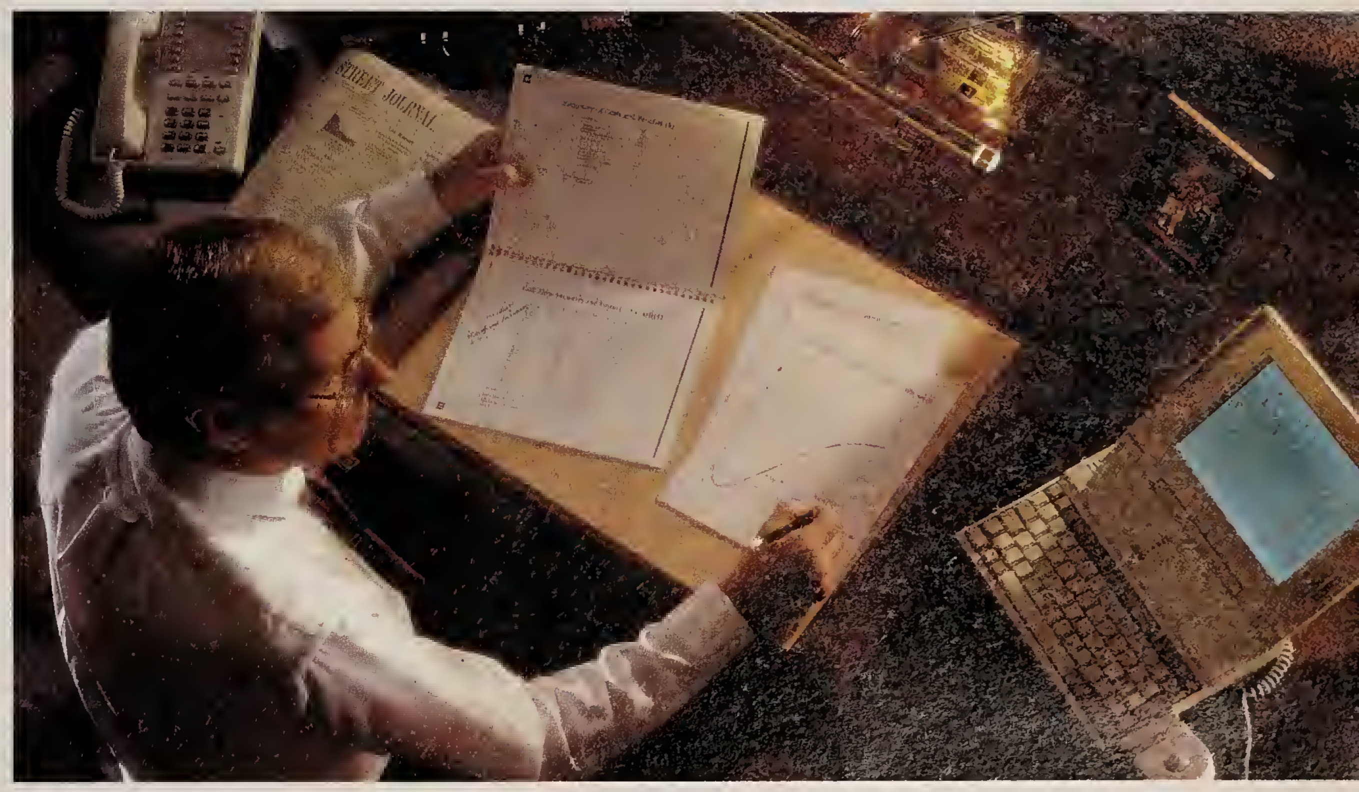

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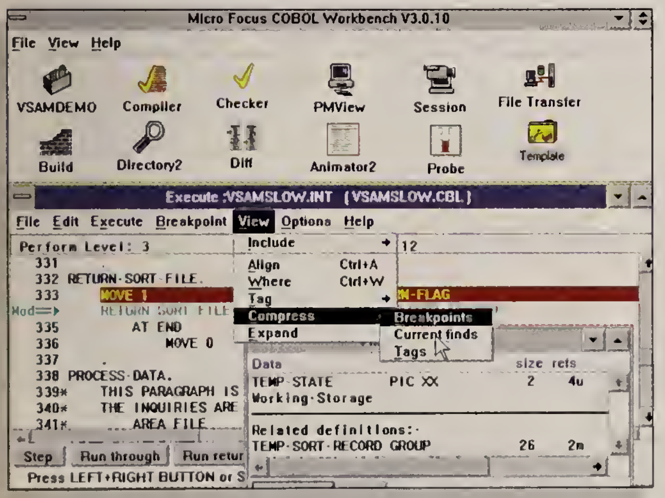

```
Perform Level: 3
 331        .
 332 RETURN-SORT-FILE.
 333      MOVE 1
Mod==>    RETURN SORT FILE
 335           AT END
 336                MOVE 0
 337        .
 338 PROCESS-DATA.
 339*     THIS PARAGRAPH IS
 340*     THE INQUIRIES ARE
 341*         AREA FILE
```

```
Data                                size  refs
TEMP-STATE            PIC XX          2    4u
Working-Storage

Related definitions:-
TEMP-SORT-RECORD GROUP               26    2m
```

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Rightsize, prioritize, organize, customer-ize

A scant four weeks into the job, IBM Chairman Louis V. Gerstner Jr. last week attempted to placate a roomful of irate stockholders with limited details on where he plans to take the company.

In the absence of "a plan," Gerstner cited "the four objectives we must and will focus on for the rest of 1993," including rightsizing the firm, sharply defining its strategic priorities, organizing IBM around that strategy and redoubling commitment to customers.

MELLA/KRONE

Louis Gerstner *has four objectives for IBM's future*

Gerstner alluded to a long, hard season of layoffs and the dicey prospect of pinning down which businesses to pursue and which to deemphasize or cut loose.

"I don't have answers for you yet. And we can't expect quick fixes," Gerstner said, asking stockholders to stay patient.

IBM analyst Rick Martin at The Chicago Corp. noted that Gerstner's very presence at the podium sent a much more succinct message than the new chairman's words could reasonably have been expected to.

"Everybody already knows what's wrong with IBM, and most have a good idea of the kinds of actions that are needed to turn that around," Martin said. "What the company needs most isn't a strategy — it's a catalyst, an outsider who can break down the old corporate culture and implement the strategy [former Chairman John] Akers already worked out."

"One thing I didn't hear [Gerstner] say, and wish I had, is that he's going to split up the IBM sales force. That's critical," added Input analyst J. P. Richard.

Strong business units such as outsourcing subsidiary ISSC, he said, "could be so much more powerful with their own sales forces. The one-company, one-sales force model is a sacred cow that Gerstner ought to slaughter." —*Nell Margolis*

Outsourcing

ISSC, Equifax sign $650M deal

By Nell Margolis

ATLANTA

IBM's Integrated Systems Solutions Corp. (ISSC) last week reeled in its first "megadeal," hooked with the advantages of its Advantis networking unit.

ISSC landed a 10-year, $650 million contract to provide a potpourri of data center, network management and disaster recovery services (see story at right) to consumer financial information services giant Equifax, Inc.

"Strategically, this is an important initiative for Equifax," said company Chairman and Chief Executive Officer C. B. Rogers. The deal, he noted, promises Equifax customers enhanced computer and network management and support, while freeing the $1 billion-plus firm's internal information systems crew to focus on application development.

Along with its IBM 3090-300, Equifax has three Amdahl Corp. mainframes and two Digital Equipment Corp. VAX 6500s.

Reliability push

In addition, the agreement aims at boosting Equifax's already substantial network reliability. "Equifax has network availability in the high 90% range," said Advantis Chairman and CEO Syd N. Heaton. "We'll meet it and better it."

J. P. Richard, an analyst at the Vienna, Va., offices of market research firm Input, said he viewed the deal as a coup for all parties "and a particularly strong strategic thrust on ISSC's part." The reason, he said, "is that they bid the Advantis card. This is going to be the proving ground where ISSC shows what Advantis can do and how smart they were to do the deal with Sears last summer."

Advantis is a networking management outsourcing joint venture between ISSC and Sears, Roebuck and Co., born last August when the two companies joined and honed their respective networking operations. On its first day, noted International Data Corp. analyst Caroline Michel, the IBM/Sears combo had some 9,000 internal customers, representing approximately 1.6 million end users.

Advantis currently has a Systems Network Architecture high-speed network and a multiprotocol network providing leased-line access at speeds up to 1.544M bit/sec. and dial access at line speeds of 300K to 19.2K bit/sec. The system boasts 4,500 attached networks, 2,500 T1 circuits, 1,100 videoconference centers and voice capacity of 1.8 billion annual call minutes.

The current contract leaves all application development in Equifax's hands.

"The ISSC people will simply be handling the systems that handle the data," an Equifax spokesman said.

Equifax may be skittish about its reputation for keeping client confidences in the wake of last year's widely reported infiltration of computers at its credit reporting subsidiary, Equifax Credit Information Services, Inc., by suspected thieves. The culprits used illicitly obtained access codes [CW, March 30, 1992; April 27, 1992].

An Equifax spokesman last week denied any connection between the incidents and any aspect of the ISSC/Advantis deal.

It's a deal

Highlights of the ISSC/Equifax contract include the following:

- ISSC will run Equifax's data center and network operations; Equifax will migrate to the Advantis network during the next 18 to 24 months.
- ISSC will handle some operating system software development; however, all application development will remain with Equifax.
- All Equifax data center staff will be employed by ISSC. ISSC project executive Nick Fici will take over as data center head.

Green revolution

CONTINUED FROM PAGE 1

housings into leading-edge machines could be further streamlined by anointing a single plastic composition as the standard to be used by all manufacturers. But Fisher said those unification efforts — because of vendor politics — are a long way off.

The immediate goal is to change computer design practices and create a "green PC," one that is more cost-effective to pull apart and reuse than toss in the dumpster.

IBM is expected to make an early move toward that goal this summer when it announces an energy-efficient PC whose housing and parts are made from a blend of recycled plastic and virgin resin.

Just like new

Key to the success of green PCs is that they be made just like machines made from virgin resins, so their maintenance and disposal costs will be identical.

Inder Wadehra, a senior engineer at IBM's Center for Environmentally Conscious Products in Research Triangle Park, N.C., said he does not expect the new PCs to cost customers a premium.

Users said that no matter how concerned they are about the environment, keeping the price of the new green machines down is key. "It's really great to see these companies act responsibly, but we've all got to keep our eye on our budget," said Trey Thompson, a systems analyst at Citgo Petroleum Corp. in Tulsa, Okla.

"Make no mistake — the only way this is going to work is if it's effective at the bottom line," added Terry Mohuruk, manager of vinyl recycling at the Geon Vinyl Division of BF Goodrich Co. in Cleveland.

The move toward ecologically responsible PCs is being hastened by the largest buyer of computers in the world — the federal government.

Last month, President Bill Clinton said the government is committed to purchasing only those computers and printers that meet the Environmental Protection Agency's Energy Star guidelines for energy efficiency. The action is expected to save the federal government $40 million a year on electricity.

Financial sense

The monetary draw of such a move is strong. Starting this summer, an estimated 70 hardware manufacturers will introduce energy-efficient computers that use up to 75% less energy than current models.

APC members said they hope the federal government might make a similar commitment to PCs that integrate reused plastics, which would encourage more manufacturers to join their recycling effort.

Analysts said the teamwork between the manufacturers and the APC is clearly a step toward keeping the cost of recycling and disposal down.

"The more we think about things like [recycling and reuse] now, the less we're going to have to worry about where we're going to build the next landfill tomorrow," said John Young, a senior researcher at Worldwatch Institute, an advocacy group in Washington, D.C.

Remade in the U.S.

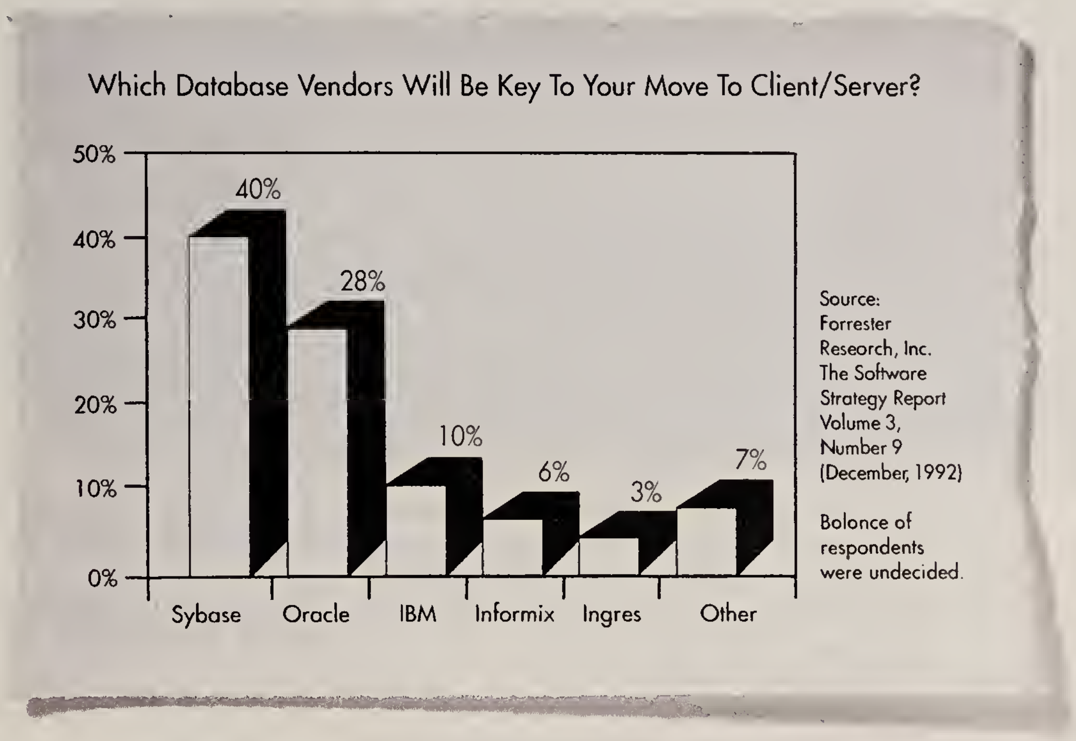
IBM
- Will make housing and parts from a blend of recycled plastic and virgin resin, beginning this summer.

Xerox
- Established an internal plastics recycling team whose goal is to incorporate 25% recycled content by weight into its products by 1995 and 50% by 2000.

DEC
- Reclaims plastic computer housing, which is returned to General Electric and recycled as roof panels for McDonald's restaurants.

Canon
- Donates $1 to environmental preservation groups for each returned printer cartridge.

The analysts have graphed the future of Client/Server computing.



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CMIP may not be dead after all

By Elisabeth Horwitt

Simple Network Management Protocol (SNMP) supporters may be premature in their claims of total victory over rival Common Management Information Protocol (CMIP). Indeed, some powerful users and vendors claim that even when SNMP Version 2 arrives, CMIP will still be the only viable vehicle for managing complex, enterprisewide network installations.

SNMP now dominates internetworking and local-area network management niches. However, companies such as Motorola, Inc. have tried in vain to find a viable SNMP-based enterprise management system and are still waiting for CMIP products.

With the recent finalization of the Network Management Forum's Omnipoint, CMIP specifications have gained stability and support from key vendors such as BT, Hewlett-Packard Co., NetLabs, Inc. and IBM. And users are beginning to evaluate the resulting products.

CMIP is more suitable than SNMP for enterprise management for the following reasons, users and analysts said:

- It supports peer-to-peer interaction across different management domains, while SNMP centrally polls remote devices. This makes CMIP far more suitable for a distributed system in which multiple network management domains exchange data for collaborative, troubleshooting and administrative purposes.
- CMIP is also more suitable for "umbrella management" systems that provide a centralized view of enterprise networks, according to Jim Moorhouse, Motorola's manager of network management strategies.

One reason is CMIP's ability to distribute management intelligence out to multiple nodes, enabling it to handle more extensive, complex networks. This is why IBM picked CMIP for LAN NetView, its product for managing "hundreds of thousands of workstations," said IBM product manager Rich Lechner.

- CMIP also allows domain management systems to initiate notifications to the central management system, such as "gee, my DASD is 90% full," Lechner said. SNMP systems' polling setup can delay the delivery of crucial alerts.
- CMIP, and its underlying Open Systems Interconnect transport protocols, are said to provide guaranteed delivery of data; SNMP and Transmission Control Protocol/Internet Protocol do not (see story at right). SNMP Version 2 is said to help the problem, but not totally solve it.
- CMIP's greater reliability makes it a strong candidate for organizations such as the Federal Aviation Administration, "whose network and systems reliability and availability numbers" are around 99.99999%, said Paul Brusil, who chairs a network management standards group within the National Institute of Standards and Technology.
- CMIP is the basis for most network management systems abroad and is virtually mandated by many European governments, Brusil said.
- CMIP and Omnipoint, unlike SNMP, use common object definitions. Many analysts and vendors view object-based systems as the next wave of integrated network management.

Michael Disabato, network manager at McDonald's Corp., spoke for many when he complained of the lack of real applications running on top of CMIP systems. The exception is telecom carriers, particularly overseas, and telecom equipment vendors — many of whom also support SNMP.

However, companies such as McDonald's may well end up implementing systems that use CMIP and Omnipoint as their foundation. Right now, McDonald's is evaluating one such product: NetLabs' Overlord.

Guiding light

"The real contribution out of CMIP is the Guideline for the Definition of Managed Objects," which provides consistent definitions for how different network management systems manage various types of network devices, said David Passmore, a vice president at Gartner Group, Inc.

Dueling protocols

A recent, week-long trial by University College, London, found, surprisingly, that CMIP outperforms SNMP when accessing large tables and when managing remote systems over a multihop wide-area link. The results:

Accessing a large table of management information from San Francisco to the UK:
- CMIP — five to 10 seconds.
- SNMP — never, after repeated attempts throughout week.

Proposed explanation: If one packet is lost in the sequence, the whole transmission is lost with SNMP; not so with CMIP. SNMP products avoid the problem by routinely retransmitting.

Retrieval of large table (100 entries) locally over Ethernet:
- CMIP — five seconds.
- SNMP — 19 seconds.

Proposed explanation: CMIP can get data in bulk; SNMP must get data one frame at a time.

Retrieval of small table (three entries) locally over Ethernet:
- CMIP — 0.3 seconds.
- SNMP — 0.8 seconds.

Net management

CONTINUED FROM PAGE 1

month to ship Overlord, an enterprise management system for which several major corporations have been eagerly waiting.

Companies such as McDonald's Corp. and Motorola, Inc. tried and failed 18 months ago to find the right enterprise management system. This year's spate of activity is causing their network managers to look again.

What makes these companies a tough sell is their need for a system that can not only manage thousands, or even hundreds of thousands, of network systems and devices but also interact with "domain managers" that specialize in a particular management function or device. These devices are often products from other vendors, running on different platforms.

This is the wave of the future for enterprise network management — but it has not quite arrived, users and analysts said.

Jim Moorhouse, manager of network management strategies at Motorola, outlined a common corporate ideal for enterprise network management: a centralized "umbrella" management system that can overview important activities happening across the enterprise and element managers that monitor and troubleshoot individual network domains.

For example, Motorola wants to be able to maintain network control centers in different parts of the world that can take over for one another as one sector goes to bed, Moorhouse said. The company also wants to set up management domains along functional lines: one for voice systems, another for wide-area transport links and a third for local-area networks, bridges, routers and front ends.

Vendors have so far failed to provide truly distributed systems where domain management systems can do local management and exchange data with one another and the umbrella manager, users said.

Several users cited Overlord from NetLabs as the most hopeful of the bunch. IBM's NetView and HP's OpenView still have the functionality of "element managers": SNMP-based systems that can manage limited installations of LANs, routers and hubs, Moorhouse said.

A major motivation for distributing network management functions out to local nodes is cost. "Once the network gets to a certain size, you need a Cray just to run SNMP," said John Seoggin, supervisor of network operations at Delmarva Power & Light Co. "And we don't want to go to anything bigger than a SPARCstation 10. Offloading [network management tasks] means you can buy capacity in small chunks as you need it."

An ideal scenario for many companies is to implement their managers on Unix and the less demanding domain managers on less pricey platforms, such as Microsoft Corp.'s Windows and IBM's OS/2. HP said it is working to address this need by providing first common user interfaces, then communications, across the Windows and Unix versions of OpenView.

IBM NetView/6000 to wear enterprise hat

By Elisabeth Horwitt

ARMONK, N.Y.

IBM is positioning and enhancing NetView/6000 to become its leading enterprise management system, leaving NetView primarily for managing IBM hosts and SNA-only installations, according to David Passmore, vice president at Gartner Group, Inc. in Stamford, Conn.

A series of new products and enhancements will metamorphose its NetView/6000 from just another Simple Network Management Protocol (SNMP) system into a powerful manager of enterprisewide networks, including IBM Systems Network Architecture (SNA) installations, IBM spokesmen said last week.

IBM's SNA/6000 software, due out by year's end, turns an IBM NetView host into an element manager that monitors VTAM SNA networks and passes alerts, configuration and traffic data to a NetView/6000 over an IBM LU6.2 link, said Sanjiv Ahuja, manager of AIX network management services. Eventually, NetView/6000 will manage SNA on its own, he added.

The ability to manage SNA installations will make NetView/6000 far more appealing to IBM users who are currently weighing it against Hewlett-Packard Co.'s OpenView, Passmore said. "NetView/6000 is a much better platform [than a NetView host] for an integrated view of everything," he added.

IBM is also preparing the following NetView/6000 enhancements:

- The ability to manage enterprise networks with hundreds of thousands of nodes. The boost is likely to come from upgrading reduced instruction set computing hardware and distributing management intelligence to distributed NetView/6000 agents.
- More sophisticated rules-based tools for correlating alerts across the enterprise and automatically responding to trouble situations.
- Incorporation of Resource Object Data Manager, IBM's SystemView-compliant, object-oriented database structure, as the basis

Wireless 'glue' stirs fury

CONTINUED FROM PAGE 1

vice president and director of Motorola's Paging and Wireless Data Group.

However, aside from a 1993 schedule (see chart page 1), a list of a dozen "endorsers" that includes RAM Mobile Data and General Magic, Inc. and a roster of as-yet-intangible characteristics, Motorola is offering few details about its technology, now renamed Mobile Networks Integration (MNI).

MNI is slated to take the form of a data gateway, an application programming interface and a developer's tool kit. It aims to allow application developers and computer/communications equipment manufacturers to design products that will operate over many service providers' wired and wireless networks. That number totals 38 today, analysts said.

Promises, promises

The to-be-licensed MNI is slated to route and deliver messages, directory services, unified billing and user profile information. Other objectives include the following:

- Lower costs to end users. The plan is for users to pay for one network connection rather than multiple network links.
- A single identification number per user for "anywhere" accessibility.
- Cohesive billing for linked services, as provided by telephone service suppliers today.
- Public key encryption for data security.

Notably absent as MNI endorsers, however, were AT&T, McCaw and any third-party developers. McCaw's current strategy is to stay focused on vertical wireless markets where users run closed pockets of wireless applications, such as field maintenance automation or courier vehicle dispatch.

Rob Mechaley, senior vice president and general manager of McCaw's Wireless Data Division, formed last week, said he does not see "any reason why a user of the RAM Mobile Data network [for example] would want to interoperate with the McCaw wireless network."

Split decision

The industry is divided on this issue. "We can hardly wait for wireless E-mail and fax, and we want it to be just like the telephone system is today," said Howard Maynard, senior vice president and director of MIS at Young & Rubicam, Inc., a worldwide advertising agency based here.

"Rob Mechaley hasn't paid very much attention to how people are going to use electronic mail," said analyst David Coursey, editor of the "P.C. Letter" newsletter in San Mateo, Calif.

"He thinks CDPD" — an emerging standard for running data over cellular networks — "is all anyone is ever going to need," added Andrew M. Seybold, publisher of "The Outlook" newsletter on professional and mobile computing.

"That's fine for vertical markets, but John Q. Businessman is going to choose other networks because CDPD has no service set up for messaging and other broad, horizontal applications," he said.

On the other hand, United Parcel Service, Inc., which runs a package-tracking application over McCaw's cellular network and an on-call air application over the Ardis packet data network, "has set up separate networks for separate applications. We don't foresee the need for interconnecting them," said Daneen Cooper, systems manager.

And while Ardis customer Avis Rent A Car System, Inc. in Garden City, N.Y., anticipates "several different wireless applications" in its future, "they will be very specific, and I don't see them talking to each other," said Peter R. Tittler, vice president of networks and technology.

"My initial reaction, though, is if I did want to connect them, I would link our users back to our wired data network" then to the different network, he said.

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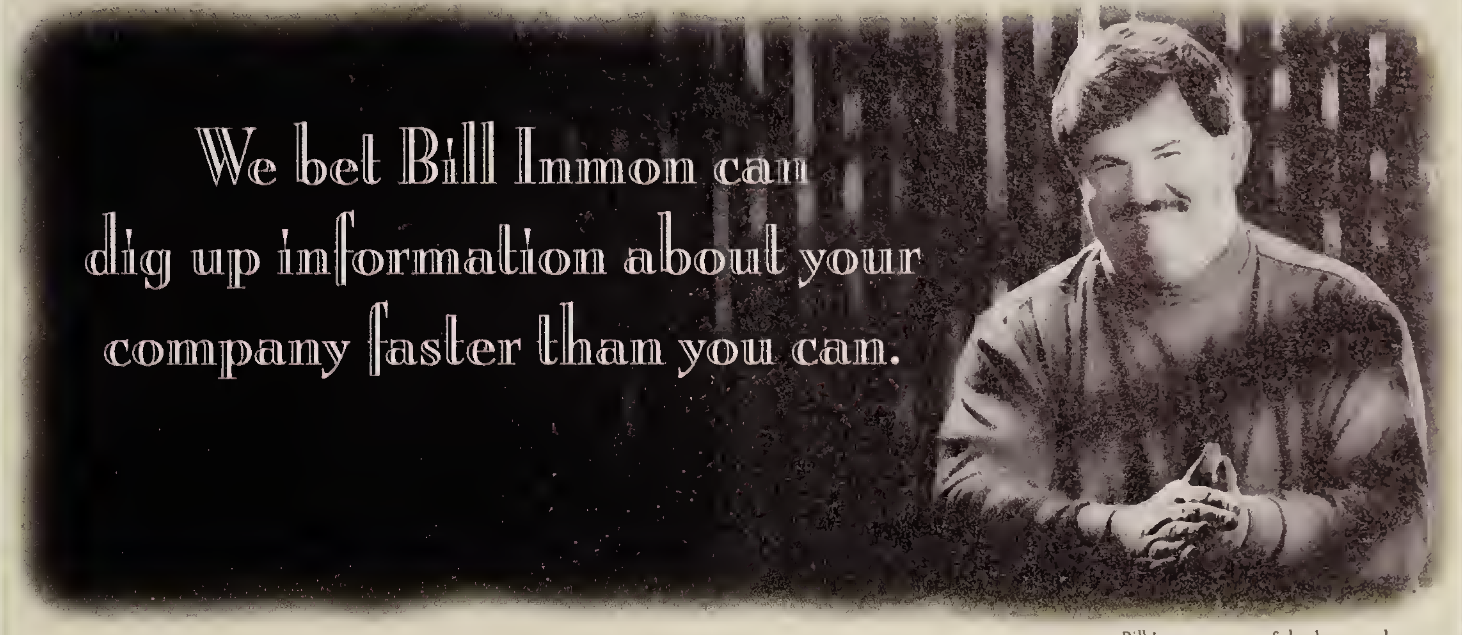
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News Shorts

Borland shows new Quattro Pro

Borland International, Inc. last week previewed Version 2.0 of its Quattro Pro spreadsheet for Windows before a group of securities analysts. Due this fall, the new release will include prepackaged macros, called Experts, that will initiate specific functions. It will also include a data modeling utility, interactive tutor and expanded Help facilities. Meanwhile, Borland created a Client/Server Division to coordinate the product development and marketing of client/server databases, software tools and middleware.

Proteon restructures, cuts staff

Networking company **Proteon, Inc.** in Westboro, Mass., last week said a corporate restructuring following a quarterly net loss of $2.67 million will result in a 15% staff reduction. The firm said it will create two independent business units: an adapter card and "dumb" wiring hub group and an internetworking and intelligent hub group.

CA told to pay saleswoman

A San Mateo, Calif., Superior Court jury awarded nearly $300,000 to a former **Computer Associates International, Inc.** saleswoman, who charged that CA had wrongfully withheld a sales commission owed her. In April 1989, Linda Sample, 44, sold a CA-Datacom DB for **IBM**'s MVS environment software package to **CTB-McGraw Hill** in Monterey, Calif., for $450,000. Shortly after the sale, Sample was demoted to an entry-level sales position after a new regional CA sales manager was brought in, according to her attorney, Daniel Bartley. After several failed attempts to obtain her commission, Sample left CA in September 1989 and filed suit against CA. CA's attorney declined to comment on whether CA will appeal.

AXPs tied to Internet

Digital Equipment Corp. has made two DEC 4000 Alpha AXP systems available to Internet users, said company officials last week. Developers can use these systems to test, qualify or port their software, and other Internet users can log on to evaluate the systems. One DEC 4000 AXP system is running DEC's OSF/1 with an address of axposf.pa.dec.com, and the other, running VMS, has an address of axpvms.pa.dec.com.

Townsend honored

William R. Townsend was named data center manager of the year by the **Association For Computer Operations Management**. Townsend, manager of the Computing Services Division at **Air Products & Chemicals** in Allentown, Pa., was nominated for his role as "a proactive agent of change and champion for the career growth and development of his staff."

SHORT TAKES **Delrina Technology, Inc.** will unveil this week a Windows version of its electronic forms software. . . . **Microsoft Corp.** has reached a settlement with **Z-Nix Co.**, a Microsoft OEM that the Redmond, Wash., firm had accused of pirating its software. . . . **Zeos International, Inc.** announced its Contenda 486, a 3.9-pound notebook based on Intel Corp.'s 25-MHz 486SL processor. . . . **United Technologies Automotive** — a $2.4 billion United Technologies Corp. subsidiary — inked a $14 million, five-year outsourcing pact with **The Genix Group**. . . . The **American National Standards Institute** is offering a registration service to provide organizations with unique electronic-mail names. . . . The **Peripheral Component Interconnect (PCI) Special Interest Group** announced Version 2.0 of the PCI bus, which includes a 3.3V definition and a finalized connector definition.

Convex, HP expand systems ties

Cross-licensing may help firm build massively parallel computer

By Ellis Booker
RICHARDSON, TEXAS

Forthcoming massively parallel processing (MPP) systems from Convex Computer Corp. last week led the supercomputer maker and Hewlett-Packard Co. to extend a 14-month-old strategic alliance by announcing additional cross-licensing of each other's software systems.

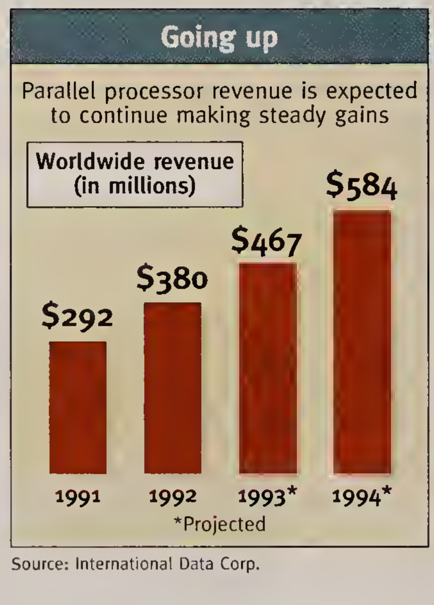
Still under development and aimed at the commercial marketplace, future MPP systems from Convex will run HP's Unix-based HP/UX operating system and use HP's Precision Architecture-RISC hardware.

"Right now, 'general purpose' and 'MPP' is an oxymoron," said Steven Wallach, Convex's senior vice president of technology. He argued that current MPP systems have largely failed to break through to commercial sites because they do not run a broad range of third-party software.

Gary Smaby, president of the Smaby Group, Inc. in Minneapolis, agreed that the commercial application of MPP technology has been hampered for this reason.

"The company that develops the silver bullet and can tap into hundreds or thousands of application codes could have an advantage," Smaby said. On the other hand, he said it was unclear how many of those thousands of commercial codes were suitable for MPP.

To differentiate between current MPP technologies and its own strategy, Convex refers to its future products as scalable parallel processing (SPP) systems. Wallach claimed an SPP system will be able to run more than 4,000 applications.



Source: International Data Corp.

The first phase of Convex's SPP strategy was launched last year in the form of the Meta Series, which links Convex supercomputers to clusters of PA-RISC processors running cluster-specific parallel software.

Convex has installed about 12 Meta Series systems, 10 of which were put in during the first quarter of this year, Smaby said.

The problem for traditional supercomputer vendors, he said, has not been meeting raw performance levels but satisfying expectations about service and support.

To address this, Convex, besides licensing HP/UX, will get a suite of "middleware" products from HP, including libraries, commands, user interface modules and utilities for software distribution and system administration.

By using HP's PA-RISC hardware platform and adapting the Mach 3.0 microkernel to include faster I/O, Convex hopes to be able to run thousands of existing HP/UX applications on its SPP systems. Concurrently, the company is continuing work on its C4, an MPP supercomputer, using proprietary chip technology.

HP invested $18 million in Convex last March. No additional investment was announced by the firms last week.

Parallel processing

Unisys unveils fast processor to connect 2200 series

By Thomas Hoffman
PHOENIX

Stepping gingerly into parallel processing, Unisys Corp. last week unveiled a technology designed to speed systems throughput for its 2200-class enterprise hosts and servers.

The Extended Processing Complex (XPC) ushered in here at the joint Cube and Use, Inc. user conference, was warmly received by 2200 mainframe customers and analysts at an already-sizzling conference.

XPC, a 6-ft-high, refrigerator-size cabinet containing a complex of microprocessors, can be linked with a single 2200 host or with any combination of four 2200/400, 600ES or Model 900 systems, totaling up to 32 processors.

Processors are linked in parallel using fiber-optic connections so that different 2200 systems can share databases and maximize system memory and disk and tape subsystems without forcing users to modify their software applications in any way.

Those features drew high praise from James L. Cassell, vice president and service director of large computer systems strategies at Gartner Group, Inc., a Stamford, Conn., research firm. "The Unisys XPC for the 2200 is one of the best solutions for high-volume transaction users requiring performance, high availability, scalability and recoverability," noted Cassell, a conference attendee.

Cassell said XPC is "at least two years ahead of the industry" in providing these capabilities using shared stand-alone storage.

In the right direction

XPC's parallel processing capabilities follow Unisys' introduction last month [CW, April 12] of entry-level parallel processing between the Single Chip A series Mainframe Processor, which powers the vendor's A series product line, and an Intel Corp. I486 chip running on a Unisys U6000/65 server.

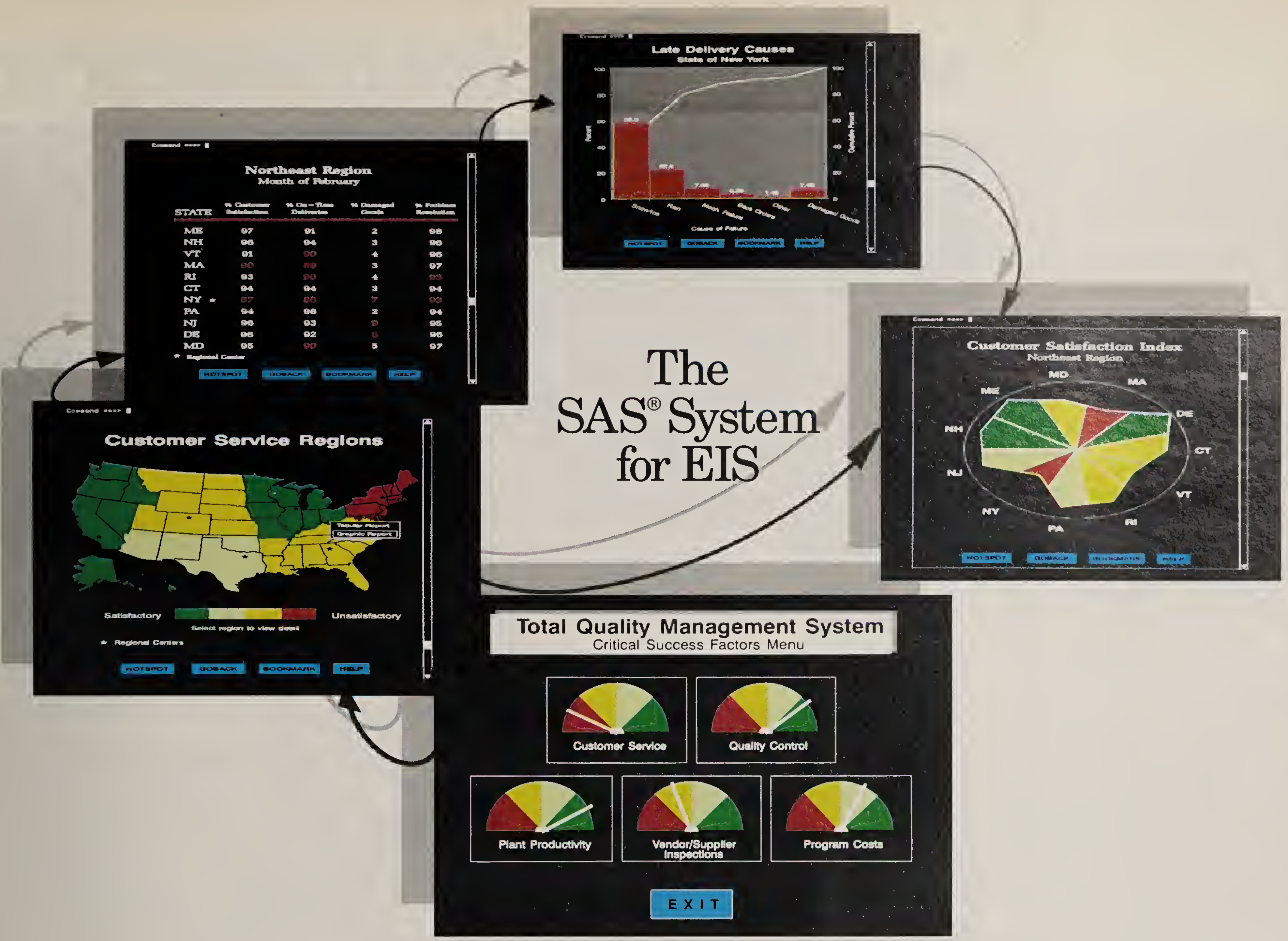
Though the announcements are unrelated, both embellish Unisys' first steps in a planned strategy to evolve its current-generation mainframes into massively parallel processing machines.

Unisys executives said early testing results of XPC have shown the system can boost mainframe throughput by up to 30% compared with existing technical capabilities of stand-alone 2200s.

Those improvements were well-received by Michael J. Minnis, senior systems analyst at Pacific Bell in Hayward, Calif. Pac Bell, which runs one dozen 2200 machines, is facing I/O constraints with its systems, particularly with its high-end 2200/900 models. Minnis said XPC may be a solution to those problems. "We're very interested in XPC since we think it could certainly help us out with some I/O issues," Minnis said.

Jim Lee, manager of technical support at Nynex Corp. in Pearl River, N.Y., said he is interested in how XPC could potentially ease resource management constraints for Nynex's three 2200 hubs. However, Lee added that any acquisition would have to be cost-justified from a performance standpoint.

Pricing for XPC is dependent on configurations with attached 2200 systems and ranges from $230,000 to $3 million. Shipment is slated for the fourth quarter of this year following the completion of beta testing this summer.



Northeast Region
Month of February

STATE	% Customer Satisfaction	% On-Time Deliveries	% Damaged Goods	% Problem Resolution
ME	97	91	2	98
NH	96	94	3	96
VT	91	90	4	96
MA	90	89	3	97
RI	93	90	4	93
CT	94	94	3	94
NY ★	87	86	7	93
PA	94	96	2	94
NJ	96	93	9	95
DE	96	92	6	96
MD	95	90	5	97

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IBM LAN Server	*802.3 Token Ring (4/16 Mbps)
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HEWLETT
PACKARD

Development tools

KnowledgeWare outlines object CASE enhancements

By Kim S. Nash
ATLANTA

KnowledgeWare, Inc. last week detailed enhancements to a recently acquired PC-based, object-oriented tool that targets the same users that Powersoft Corp. and Gupta Corp. want to capture.

However, several attendees of the KnowledgeWare user group meeting here said that while they want to see what ObjectView is all about, they are too swamped with mainframe computer-aided software engineering (CASE) to change tracks in the near term. KnowledgeWare inherited the product during its February buyout of Matesys Corp.

Neil Morgan, vice president of the Bank of New York, offered a typical response: "Sure, I'll go see [ObjectView]. But we've got enough to do with keeping our mainframe projects going. There's just no time to sit down with something new right now."

Nevertheless, KnowledgeWare is doing what is necessary to keep up with the Joneses, according to Charles Troutman, manager of business systems development at Cessna Aircraft Co. in Wichita, Kan.

Improvements to ObjectView will be rolled out in stages this year. Phase one will include the ability to import Data Definition Language information from KnowledgeWare's Application Development Workbench (ADW)/Design Workstation to ObjectView, said Paul Hessinger, KnowledgeWare's senior vice president. That way, developers will be able to model and change SQL databases supported by ObjectView, such as Oracle Corp.'s Oracle and Sybase, Inc.'s Sybase, via ADW tools, he said.

Phase two calls for making that link bidirectional with both ADW/Design and ADW/Analysis workstations.

KnowledgeWare and Information Builders are expected to announce bidirectional links between ADW and EDA/SQL next week. Pricing has not been set.

Troutman said he has seen other CASE makers, such as Intersolv, Inc., scamper to add PC modules and support for Unix-based relational databases to what historically have been IBM mainframe-centric workbenches. That, combined with newer offerings such as Powersoft's PowerBuilder, means vendors are now zinging a lot of products into the client/server market.

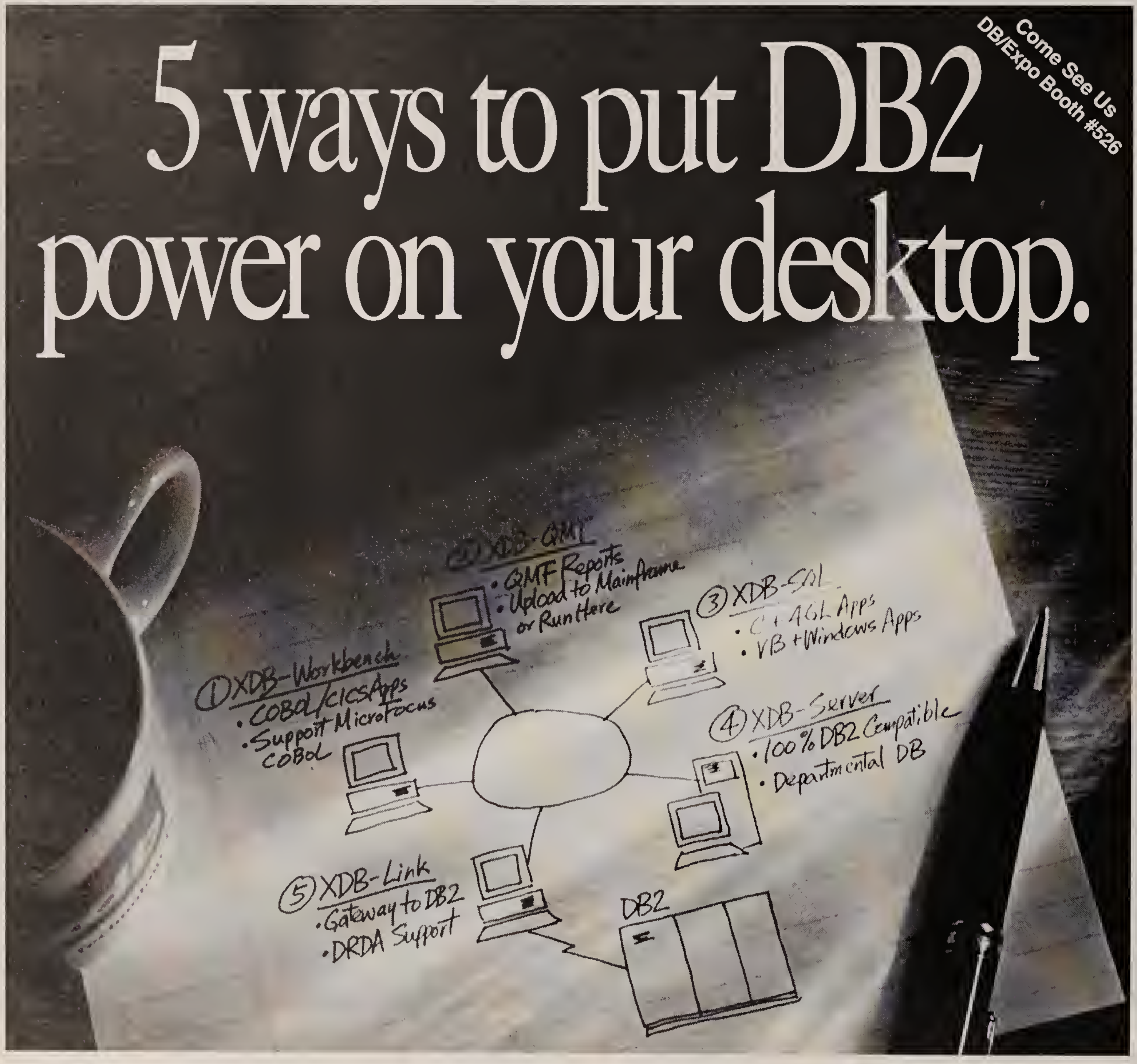
"We have a lot to choose from," Troutman said. "But we still have to wait and see how it all comes out."

Meanwhile, ADW "is very much alive and well," Hessinger said, seeking to assuage fears that KnowledgeWare's bread-and-butter mainframe customers were forgotten amid ObjectView hype.

Users can look for the following enhancements in the third-quarter release of ADW 2.7.02:

- ADW/Encyclopedia Expert, a $3,500 utility KnowledgeWare bought from third-party developer Model Software, that manages ADW's repository via PCs.
- A workgroup tool to let up to 10 developers work on a project simultaneously.
- Easier exchange of information among modules that cater to different parts of the development life cycle and an update of ADW/MVS generator.

Such promises have made Marvin Taylor happy. Taylor, supervisor of systems and programming at Farm Bureau Insurance in Indianapolis, said a dearth of PCs at the company will keep him doing mainframe development for the foreseeable future. "A lot of companies are like us, where you just need mainframes for big, big applications," he said.



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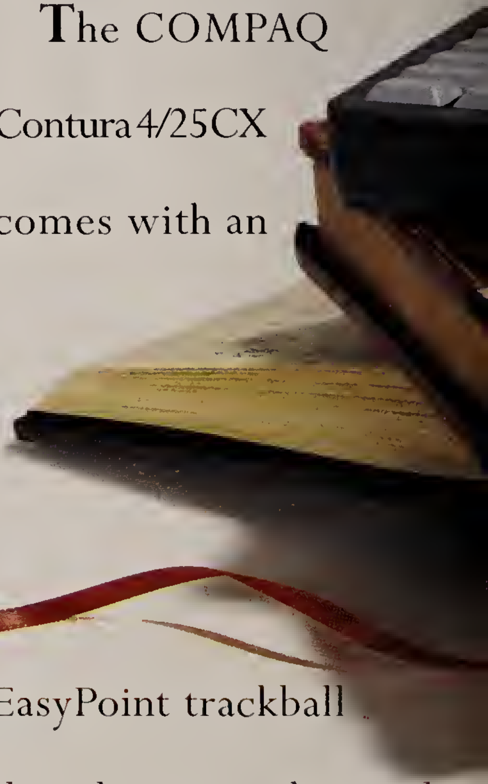
4/25CX: *Active color VGA* ◈ *Integrated EasyPoint trackball* ◈ *NiMH battery* ◈ **4/25c:** *Advanced passive color VGA* ◈ *COMPAQ Trackball* ◈ *NiMH battery* ◈ **4/25:** *Monochrome VGA* ◈ *COMPAQ Trackball* ◈ *Enhanced NiCd battery*
All models: *Intel 25MHz 486SL with 8K cache and numeric coprocessor* ◈ *4MB RAM (up to 20MB)* ◈ *120MB or 209MB hard drive* ◈ *Preinstalled Microsoft Windows 3.1 and MS-DOS 5.0 as published by Compaq*
4/25 starts under $1,999†

You have your choice of three Contura screens, all of which offer razor-sharp definition. There's an active matrix screen that displays information in 256 colors. There's an advanced passive matrix color screen that offers 50% better contrast, and 33% improved response time over earlier passive technology. And there's a crisp and clear monochrome version as well.

The COMPAQ Contura 4/25CX comes with an EasyPoint trackball that eliminates the need for a mouse. And all of the Contura models offer a unique feature called



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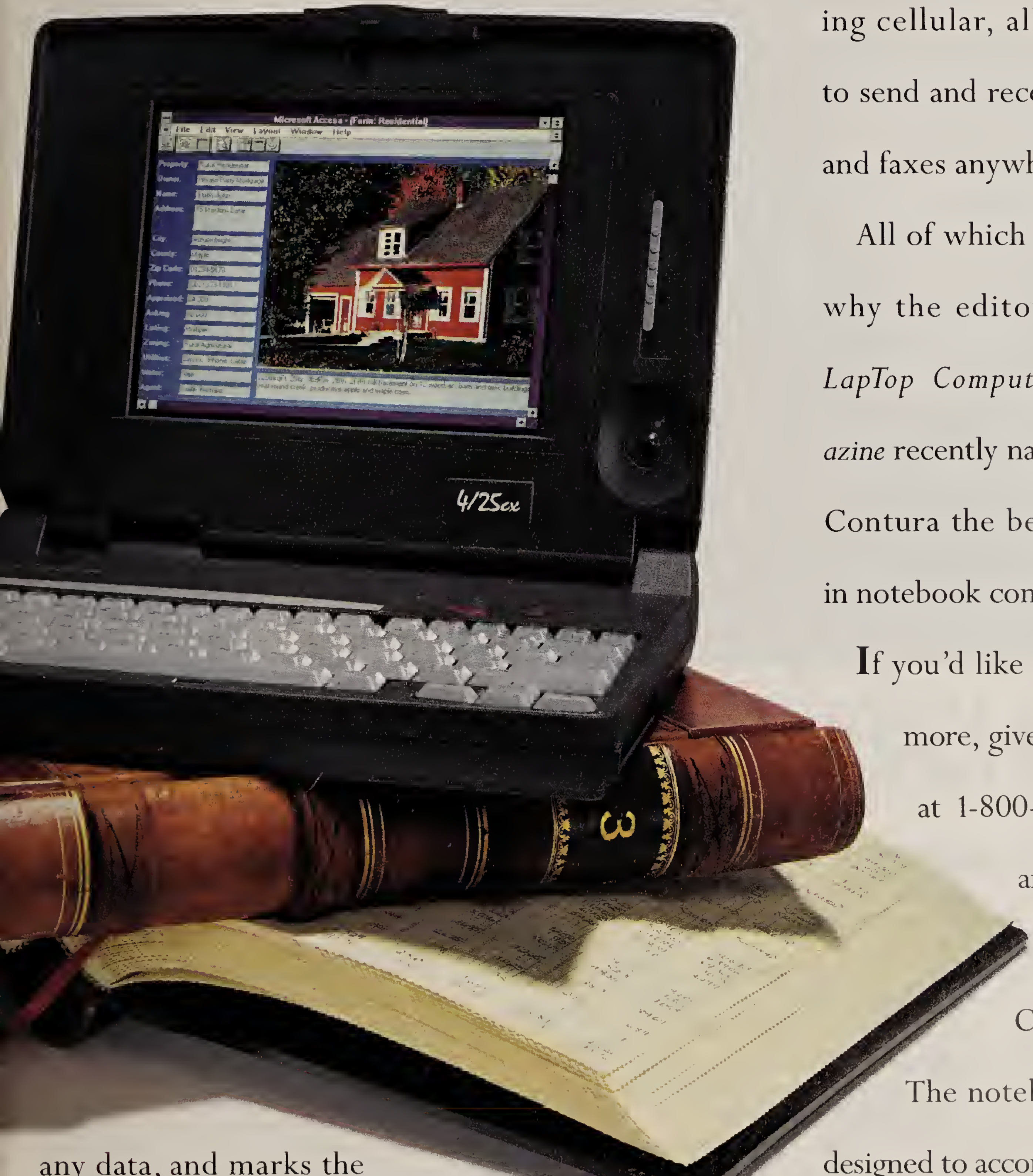

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All of which explains why the editors at *PC LapTop Computers Magazine* recently named our Contura the best value in notebook computers.

If you'd like to know more, give us a call at 1-800-345-1518, and ask us about Contura.

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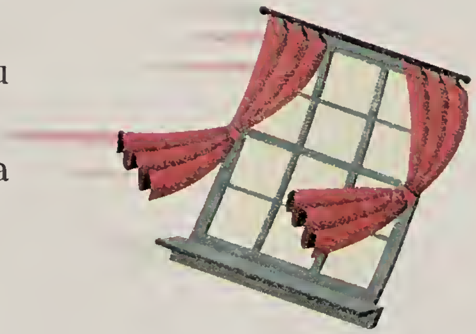

*Thanks to our advanced graphics accelerator, Contura blows the doors off most other Windows notebooks. In fact, it runs Windows 30% faster than most 486 machines.**

*Nothing is backed like a Compaq because nothing is built like a Compaq. Contura includes a free three-year, worldwide warranty with a year of on-site** service in the US or Canada.*

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*In tests run by Compaq using *PC Magazine* Labs WinBench Release 3.1 **This service is provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. For further details on our limited warranty, contact the Compaq Customer Support Center.

Vendors back next-generation FDDI

Unshielded twisted-pair products for high-speed nets leapfrog draft standard

By Lynda Radosevich

Products based on the Fiber Distributed Data Interface (FDDI) over unshielded twisted-pair networking standard, which reached draft form in February, will roll out this week.

Network Peripherals, Inc. will announce FDDI over unshielded twisted-pair adapter cards, and SynOptics Communications, Inc. will announce FDDI hubs. The companies said they worked together to ensure interoperability between their products.

Aimed at use in network servers and high-performance workstations, the products will allow users to run FDDI's 100M bit/sec. maximum networking speeds over Category 5 (data grade) copper cabling. This is a typically lower cost cabling scheme than the fiber requirements of the current FDDI standard.

Pricing for FDDI over unshielded twisted pair is meant to rival anticipated pricing for products based on 100M bit/sec. Ethernet standards, said Gordon Stitt, vice president of marketing at Network Peripherals.

The adapter cards, available now, cost $995 for SBus and AT bus computers and $1,495 for Micro Channel Architecture and Extended Industry Standard Architecture bus computers. Fast Ethernet adapters are not available yet, but pricing is expected to be between $600 and $1,000. The SynOptics hubs will cost $714 per port and will be available in the third quarter, SynOptics said. Modules compatible with existing SynOptics System 3000 modules will cost $3,750.

Unmatched

However closely vendors' products adhere to the draft standards, there is a possibility that the products will not exactly match the finished standard.

"The standard is quite far along, but there are still outstanding technical issues," said William Cronin, chairman of the ad hoc committee working on FDDI over unshielded twisted-pair standards.

Remaining issues include particulars about transmitter and receiver behavior. "Officially, it isn't a standard until it is blessed by the board of standards review," he said — an event that may happen by the end of the year. Whether this would impact the compatibility of draft-standard products and standards-based products is unclear, Cronin said.

Used in network servers and high-end workstations, FDDI over unshielded twisted-pair wiring results in a lower cost cabling scheme than traditional FDDI.

For organizations with users running data-intensive applications, such as NASA's Jet Propulsion Laboratories (JPL) in Pasadena, Calif., FDDI over unshielded twisted pair presents an available high-bandwidth desktop solution. Other high-bandwidth options including 100M bit/sec. Ethernet and Asynchronous Transfer Mode (ATM) high-speed networks are in earlier stages of development.

The 5,000-employee JPL, which uses an FDDI network backbone, will begin testing the Network Peripherals and SynOptics copper-based products this month, possibly for use by workstation users doing scientific imaging processes and other applications, said Ted Su, network engineer.

The lab will also consider ATM networks but cannot implement ATM until congestion- and flow-control issues are addressed, Su said.

Prestandard hubs and adapters for FDDI over unshielded twisted pair already exist. For example, Crescendo Communications, Inc. in Sunnyvale, Calif., has been shipping such products since January 1992. Crescendo technology comprises the basis of the developing standard.

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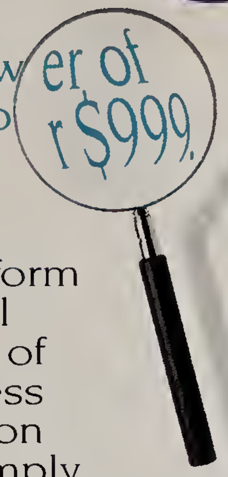

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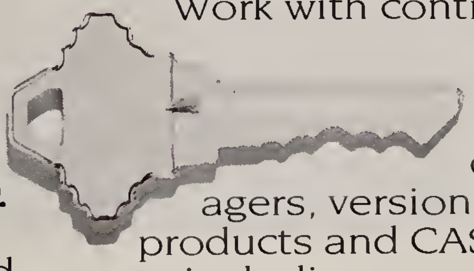

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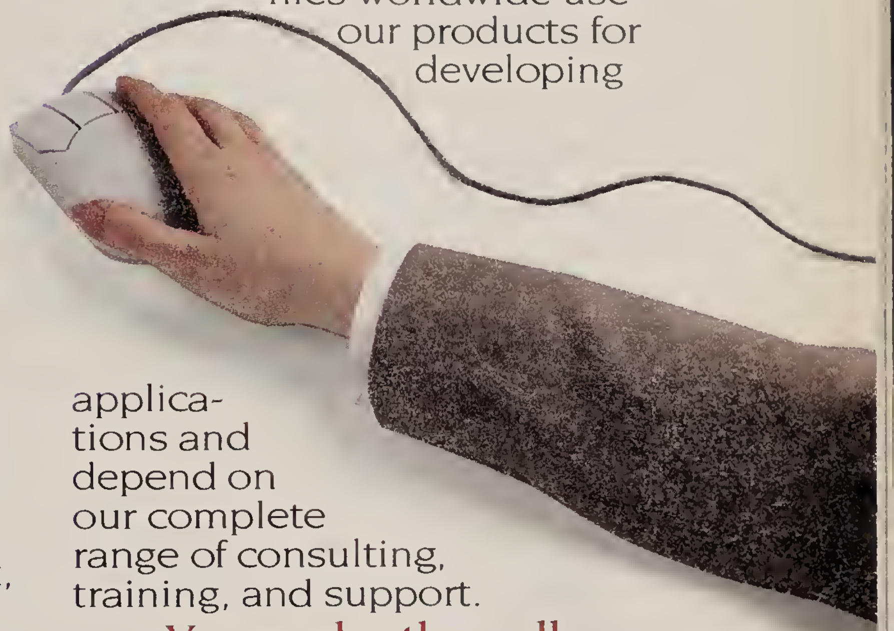

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yes NetWare Tested and Approved

With the Maximum Availability and Support System/2 (MASS/2) option, the Server 195 provides comprehensive local and remote server monitoring, control, tuning

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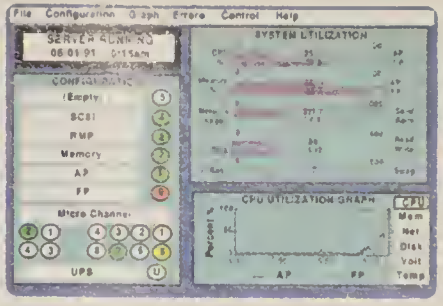
It even tolerates

and recovery capabilities. MASS/2 works with a battery backed-up Remote Maintenance Processor (RMP) option that can notify you of errors, failures, corrective action taken—even provide system access during a power failure. And you can extend fault tolerance to the entire disk subsystem by adding an Orthogonal RAID-5 Disk Array/2.



The MASS/2 option has a user-friendly GUI that lets you distribute computing power across your organization from a central location.

Server 195/295 Comparison

Feature	Server 195	Server 295 Model 1	Server 295 Model 2
Remote Maintenance Processing and Modem	optional	standard	standard
Processors	486/50 MHz	MP–486/33 & 50 MHz	MP–2 486/50 MHz
Available Slots	8 Micro Channel®	12 Micro Channel	12 Micro Channel
MASS/2	optional	standard	standard

Like all PS/2s, the Server 195 is backed by IBM HelpWare™—a range of service and support so complete, it's hard to find fault with. You get a three-year on-site warranty with four-hour average response time,* around-the-clock set-up, usage and service assistance on IBM hardware and software during warranty,** a 30-day money-back guarantee** and more. For more information or an IBM certified dealer near you, call our Personal Systems HelpCenter™ at **1 800 772-2227** or TDD ASCII **1 800 426-4238.** In Canada, call **1 800 465-7999.** The new PS/2 Server 195 is so reliable, why would you tolerate anything less?

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Tire-kicking technology

AMS' chief technology officer describes his firm's new lab

Even though American Management Systems, Inc. (AMS) had its best year ever in 1992, the systems integrator and software house undertook a major strategic review of its business and decided to rededicate itself to being a technology leader.

To that end, AMS recently tapped software expert Jerrold M. Grochow as chief technology officer and established the AMS Center for Advanced Technologies as an applied research laboratory.

Grochow has had a 20-year career at AMS and formerly worked at MIT, where he earned a doctorate degree. Grochow recently talked with Computerworld *national correspondent Mitch Betts about the center, which opens this month in Fairfax, Va.*

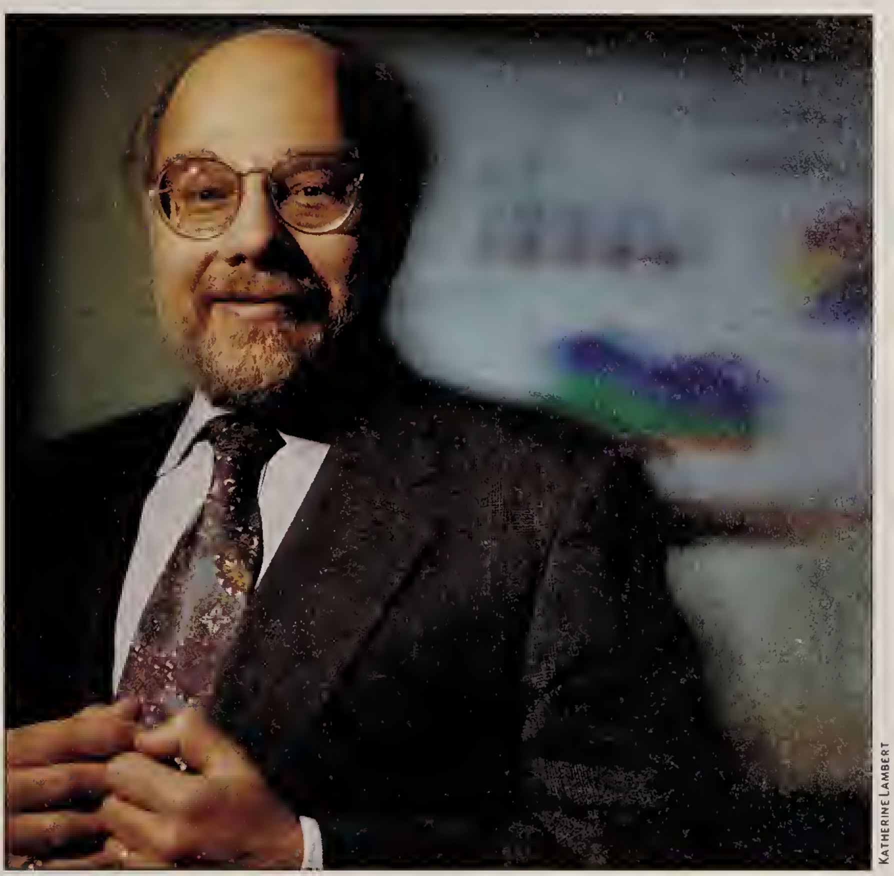
Q. Why start an advanced technology laboratory now?

A. The technology for developing large-scale business systems is changing so dramatically that AMS is making a major push to get out in front, lead where it's going and make sure our clients are making effective use of these new technologies.

Q. How did you choose topics to study?

A. We already had some active research programs, so we picked the ones we think will have the most impact across the organization. For example, object technology is a very obvious one. In multimedia, one of our business units had a fledgling research activity, but now we see that becoming much more pervasive in all of the work we're doing.

Research on mobile computing began in one of our federal defense units, but now we see applications in a range of industries including insurance, utilities, banks and telecommunications.


KATHERINE LAMBERT

AMS' Jerrold M. Grochow: *'Vendors make a lot of claims about what their software can do, but until you get the hardware and software plugged together, you can't verify whether it will perform well'*

Q. What will the client/server lab do?

A. We're bringing in equipment from a variety of manufacturers and tying it into our existing and experimental networks. We'll be able to advise our clients about which technologies actually work and which are hype.

We'll also have what I call the "workstation of the future," where people can see what they might have sitting on their desktop in three or four years. It's a combination of technologies . . . that exist today but are too expensive.

Q. Can you test whether Product X works with Product Y?

A. That is certainly one of the activities we're engaging in — a systems integration activity. Vendors make a lot of claims about what their software can do, but until you get the hardware and software plugged together, you can't verify whether it will perform reasonably well in a high-volume business environment.

We're also starting a new performance measurement lab. We see a real need to be able to predict the performance of some very complex client/server application systems — systems that involve multiple servers [and multiple networks].

There is some literature about the performance of very simple server networks, but if the database is spread over three different server machines and there are transaction servers and imaging servers and so on, no one does that kind of analysis.

So, we're starting to do simulation and modeling to predict performance. Performance is a key issue when information systems departments move from mainframes, where they understand the performance characteristics, to these complex networks.

The technology for developing large-scale business systems is changing so dramatically that AMS is making a major push to get out in front.

Q. How do you make sure the research is relevant to business needs?

A. We'll get guidance from both an internal board and an external board of advisers, which will include academics and chief information officers from around the world.

Of course, we'll be hedging our bets. We'll spend a small amount of money to find out what impact virtual reality will have on business in the future. But we'll spend a lot more figuring out how to bring object technology into the business mainstream and how to get the promised benefits.

Q. Would you kill research on a technology that either fizzles or matures?

A. Absolutely. I expect that over time, some of our labs will come and go and some will change their focus.

Two years ago, we might have created a lab for document imaging, but that technology is now in the mainstream, so it doesn't need an advanced technology lab.

Two or three years from now, maybe object technology will be mainstream, although I suspect it may take a little longer than that.

What the center will do

▶ Besides consolidating various AMS research projects, the Center for Advanced Technologies will analyze the practical issues involved in implementing new-wave technologies such as client/server computing, object-oriented programming, pen computing and multimedia workstations.

AMS' total budget for research and development was $15 million in 1992, or 4.5% of total revenue ($333 million).

The center has a handful of full-time employees and more than 150 part-time associates. AMS consulting clients will have access to the laboratory at no additional charge, and the laboratory's results will also be disseminated through seminars and technical papers.

The center will have research units focusing on the following areas:

- **Applications architecture:** Promoting reusable software.
- **Client/server technology:** Distributed computing environments, workstation operating systems, database servers and interoperability testing.
- **Collaborative work environments:** Lotus Development Corp.'s Notes software and electronic meetings.
- **Computer/Human interaction:** Graphical user interfaces and usability testing.
- **Mobile computing:** Examining pen-based interfaces, wireless data communications and the integration of mobile technologies with client/server systems.
- **Multimedia:** Enriching applications with interactive video and audio.
- **Object technology:** Development languages, tools and database management systems.
- **Performance and measurement:** Modeling complex client/server systems to assess their performance and capacity constraints.

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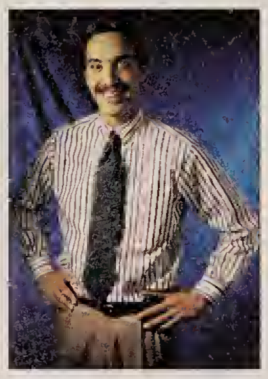
Editorial

Open and shut

One trillion dollars — 10^{12}. One big chunk of moola (unless, of course, you're the federal government, which spends that much every few months).

This staggering amount also represents the approximate value of the installed base of so-called legacy or proprietary systems worldwide—most of it here in the U.S. Not included in this total are the tens of billions of dollars that went into training people to install, program and manage these systems.

This installed base of users and machines also represents the main reason why the gulf between the promise of open systems and its reality will remain wide well into the rest of this decade. As the international user group X/Open Co. noted, "The unstoppable force, open systems, seems to have met the immovable object of installed systems. The energy given off by the collision is frustration, primarily with the vendor community."



Many of X/Open's members said they also believe vendors are resisting the shift to openness. Instead, vendors are attempting to lock open systems-seeking users in with proprietary functions and are "creating confusion via subsidy of competing standards, consortia and technology frameworks."

Vendors seeking to partner with corporate users should first seriously consider what users want. Very often they do not. Instead of getting the much-needed bridges between the proprietary and open worlds, users get pieces of each and are left to cobble them together, either by themselves or with their consultants.

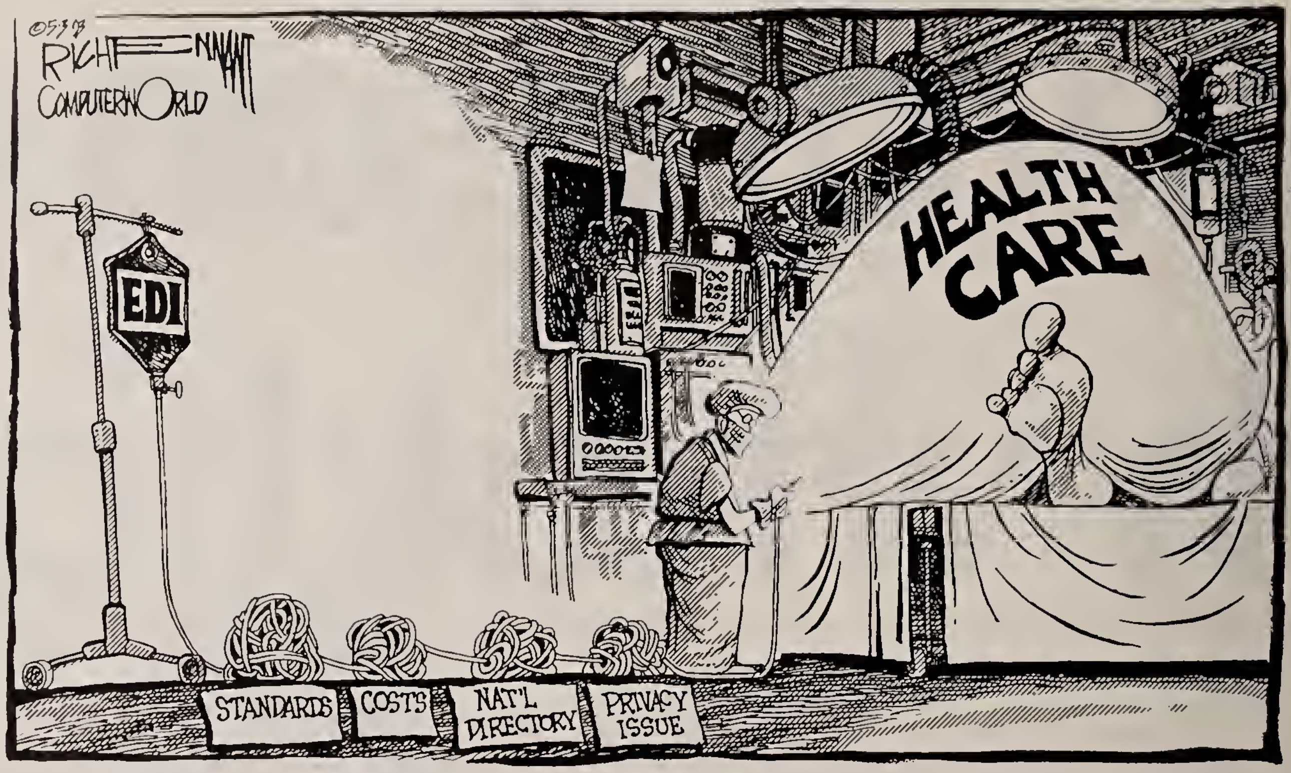
Vendors should also be aware that perceptions of openness, or lack thereof, will weigh heavily in purchasing decisions. These perceptions will be shaped by the degree to which vendors tailor their products to user demands.

For example, the keynote speaker at the recent Society for Information Management's conference chided those who "buy into the lie that Microsoft's Windows NT" is an open product. In fact, a theme that consistently arises when I speak to senior IS managers is the fear that Microsoft is growing into the company that IBM was in the '70s and '80s — a company seeking to set standards itself rather than customize its offerings to corporate requirements.

Whether this is perception or reality, the buying public absolutely will sort out those vendors that serve it from those that seek to control it. After all, the vendor landscape today is littered with the wrecks of companies that heard, then ignored, the open computing call.

Bill Laberis

Bill Laberis, *Editor in chief*



Letters to the editor

Love at first Step

"PC vendors step up to NextStep 486" [CW, April 19] confirms the widely held impression that NextStep is by far the most advanced object-oriented programming environment available today.

What is less well-known is that NextStep is also an elegant, intuitive, easy-to-learn user interface that sits on top of the robust, standard, multitasking operating system Unix. NextStep is not just a development environment. I have seen many users, ranging from complete neophyte to expert, learn to use NextStep in a much shorter time than is typical for other GUI systems.

One reason is that NextStep applications tend to have very consistent user interfaces. The application kit contains most of the tools that are needed for common user operations such as selecting files, choosing fonts, printing, displaying menus, etc. These tools are easy to program with and versatile enough to handle pratically all special needs, so developers nearly always use them.

By describing NextStep as only a development environment, you do Next, Inc. and your readers a disservice. Most users fall in love with NextStep very quickly.

Nigel G. S. Taylor
Parkside Station, N.Y.

Wireless a winner

"Wireless computer card ships" [CW, March 29] underscores the importance of PCMCIA-based wireless networking for the burgeoning mobile computer marketplace. However, the article's comparison of wireless' data transfer rates to that of wired Ethernet networks misses the mark. Properly conceived, wireless networking should be viewed as an extension or enhancement to existing wired networks rather than a replacement technology.

Today's wireless networking products provide an effective solution for mobile professionals who need a network connection for many of the most popular networking applications, including E-mail, printer sharing, file transfer and terminal emulation.

In addition, PCMCIA-based wireless LANs offer a major improvement in network performance for mobile workers using wireless, handheld data communications devices in application environments such as health care, manufacturing and retailing.

Without a doubt, the wireless revolution has just begun.

David King
Mountain View, Calif.

Odd couple

Regarding the articles about the alliance between Microsoft and Compaq ["Compaq, Microsoft to extend partnership, CW, April 12 and "PC factions rearming," April 19]: Why did Microsoft choose Compaq? A majority of Compaq's latest models have serious design flaws and enough trouble functioning in their own right.

Microsoft could surely have chosen to publicize its existing relationship with Dell or Gateway — whose products are more like Microsoft's in stability and reliability.

While it is clear that Microsoft is merely creating the appearance of a threat to the Apple/IBM alliance, it should have waited until Compaq "cleaned house."

The only benefit from a Compaq alliance is name recognition, and to this reader that recognition is not positive.

David B. Ciolkowski
New York

Terrible two

I have noted with interest your recent layout changes. In the past few months, you have changed Page 2 a number of times.

The original format was in the form of an index that contained a short summary of each article. The present format only lists a few items.

In the past, I used Page 2 to determine how to find articles of interest to me as well as to keep up on current events. Each of the changes has been progressively less useful to me.

I have enjoyed the newspaper and have found it of value to my computer knowledge base. Unfortunately, that is no longer the case.

I encourage you to return to your previous Page 2 format.

Michael Somand
Pleasant Ridge, Mich.

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An Object Management Group White Paper

Object Technology

A Component Technology for the Future

OBJECT MANAGEMENT GROUP

DEAR COLLEAGUES:

As readers of this insert, you are obviously looking for new technology to help your organizations adapt quickly to change and provide the competitive advantage needed to prosper in today's dynamic business environment. In founding Taligent as an independent software company in March 1992, Apple and IBM jointly affirmed what both companies had already decided separately: that object-oriented programming was just such a technology base. Taligent believes that the full exploitation of object technology has the potential—like other breakthrough technologies such as the transistor, magnetic media and the microprocessor—to drive major paradigm shifts and fuel new periods of expansive growth and innovation.

At Taligent, we are designing and building a new system software environment that leverages the use of object technology at every level of its architecture. Our goal is to provide a multiplatform environment that will bring about dramatic improvements in application development productivity while enabling new classes of innovative applications that address real world business problems.

We recognize that the success of our strategy depends on participation from every segment of the computer industry. That's why the new environment will be open and extensible. We are working with some of the world's most advanced corporate users of object technology and developers of application software packages to help us shape our product designs and business strategies. These early adopters have shared their experiences* with us and have identified key goals for the next generation of information systems. Taligent is developing a set of products to be responsive to their needs in the mid 90s and beyond.

While our approach is new and unique, we recognize that change must come in orderly increments and at a pace that will enable customers to move to the next generation of system software. That's why we're working with our investors, Apple Computer and the IBM Corporation, as well as others in the industry, to provide smooth transition strategies to work with what came before us.

Taligent™

While change is always unsettling, in change comes the real opportunity to reach new levels of competitiveness and innovation.

Sincerely,

Joe Guglielmi

Joseph M. Guglielmi
Chairman and Chief Executive Officer

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* **For your copy of Taligent's "Lessons Learned from Early Adopters of Object Technology" white paper, please contact 1-800-288-5545, ask for Department TL1.**

INTRODUCTION

Software development is like an old, but well-kept house. It is built on a solid foundation, gets a new coat of paint every few years and, generally speaking, provides a comfortable abode. It may not be the Taj Mahal, but it is livable.

Even the most meticulously maintained old house, however, is subject to the inevitable ravages of time. So it is with software development. Built on a foundation of procedural programming, it has periodically enjoyed the new paint of enhanced programming techniques, but has grown uncomfortable as these cosmetic updates failed to produce significant increases in programmer productivity. This old house needs rebuilding.

Object technology can provide the new approach necessary to bring software development into the '90s and beyond. With its ability to treat abstract entities like real-world objects, it provides reusable programming while eliminating the costly and complex "spaghetti code" that keeps valuable programming expertise focused on maintenance while new applications wither on the vine.

Words like "messages" and "classes" take on new meanings in the lexicon of object technology. Used as a means of communication between objects, messages enhance software development by streamlining the process. By creating classes, object technology provides a richness of information and establishes a hierarchy that clarifies objects and their attributes.

Although nascent, the object technology market is growing vigorously. The four major segments — languages and programming tools, developers' toolkits, object-oriented databases and object-oriented CASE tools — are attracting a steady stream of new vendors and users alike. Annual growth rates of over 100% are expected over the next five years.

Despite its glowing possibilities however, object technology is still largely unproven in the eyes of users, who have grown to disdain the hyperbole that typically attends new technology. The expanding product base and efforts aimed at establishing object-oriented standards will help break down the barriers between these users and what may become the Taj Mahal of technologies.

This White Paper was written independently of the Computerworld editorial department by John Slitz, Vice President of Marketing, the Object Management Group.

For more information on the White Paper Program, please call 508-879-0700.

A Component Technology for the Future

The modern business enterprise is under assault. Rapidly changing technology and worldwide markets, coupled with the globalization of businesses linked by new communications technology, have precipitated a crisis. Organizations are challenged to modify their internal structure, and most importantly their information systems, to address rapidly changing market conditions.

The result is a worldwide business climate where opportunities appear and disappear, like Flying Dutchmen on foggy nights. Those businesses that fail to respond fast enough, or do not heed the early warning signs, flounder on the reefs of lost market opportunity.

Object Technology: The Optimal Defense

There exists a critical technology that is changing the way we conceive, build, use and evolve our computer systems. It is a technology that many companies are adopting to increase their efficiency, reduce costs and adapt to a dynamic marketplace. It is called object technology (OT).

By allowing the integration of disparate and noncompatible information sources, OT has the potential to precipitate a revolution in information systems design on a par with that caused in computer hardware by the introduction of the computer chip. Yet OT is not a new phenomenon. Development and product releases have been ongoing since its origin almost 25 years ago. However, the recent emphasis on the complex task of enterprise information technology integration has brought OT into the spotlight.

OT promises to provide component-level software objects that can be quickly combined to build new applications that respond to changing business conditions. Once used, objects may be reused in other applications, lowering development costs and speeding up the development process. Because objects communicate by sending messages that can be understood by other objects, large integrated systems are easier to assemble.

Each object is responsible for a specific function within either an application or a distributed system. That means that as the business changes, individual objects may be easily upgraded, augmented or replaced, leaving the rest of the system untouched. This directly reduces the cost of maintenance and the timing and extendibility of new systems.

The Software Revolution

The past 30-year period has been a time of incredible growth and change for the computer business. Once populated only by expensive and scarce mainframes, the computing landscape has been overrun with smaller, faster, less expensive computers. This revolution has corresponded with the rise of an independent software business growing to supply ever-smaller computers with a wide array of software products.

While the means and underlying philosophy for producing computers has radically changed over this time period, the philosophy used for producing software has not. The development of microprocessor technology, "computers on a chip," gave hardware vendors a flexible building block from which to rapidly improve and assemble ever-faster and less expensive computers.

On the software side, no such rapid developments were forthcoming. That meant that each new product required software designers and programmers to start from scratch and produce more and more code until the program was finished.

The Problem: Incompatibility

The conditions that stimulated the growth of the software industry gradually changed as businesses recognized the value of integrated information and the increasing costs of maintaining their legacy systems. (Many believe the cost of that maintenance consumes 60% to 80% of the total money a company spends on software.)

Moreover, local area networks began linking the rapidly growing number of PCs, printers and servers, and enabling the easy movement of files at the workgroup level.

It became easy to see that the larger sharing of information across an enterprise could result in faster and better decisions when addressing rapidly changing market conditions. This realization led to a monumental problem.

The problem was that until the late '80s, little or no thought was given to making the result of one application transparently available to another application, much less having one vendor's system easily communicate with another's. The folly of such a myopic approach became obvious when someone finally realized that, worldwide, there was easily over a trillion dollars of installed and useful software and hardware and that almost all of it was developed to either ignore or inhibit the flow of information to other systems.

Vendors wanted to preclude the easy movement of information in the belief that it would keep them from losing customers. They only thought of how to lock customers into a particular application or hardware line. But greed was not the only culprit. What also led to this proprietary environment was the sheer technical difficulty of designing and building open systems without conventions, standards or user demand.

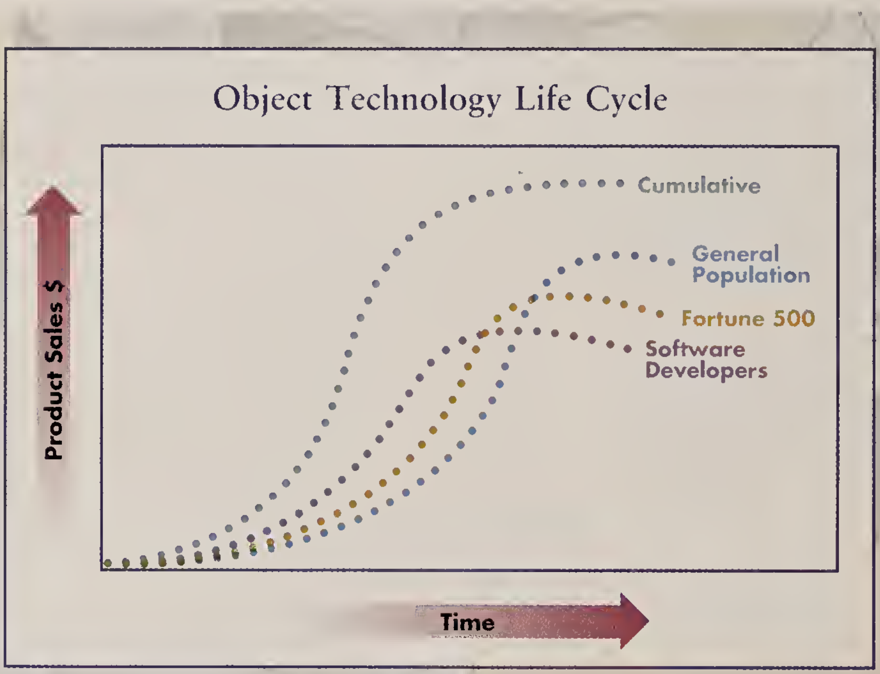
Dealing With The Dilemma

Now that these realities have been faced, users have a dilemma: how can they produce the vast amounts of software needed to build integrated enterprise computing systems while continuing to maintain the incompatible legacy systems? If not addressed, this problem will devour even the most lavish IS budget while expanding the trillion dollars worth of legacy systems.

Unabated, the current situation must either lead to a substantial increase in funding for IS or a basic change in the way software is produced and maintained. In the scramble to integrate independently constructed software and hardware into enterprise computing systems, the level of interdependence and complexity will go up exponentially.

It is important to examine what benefits can accrue through a shift to OT. Studies of software development processes in general have shown that the key areas of concern are:

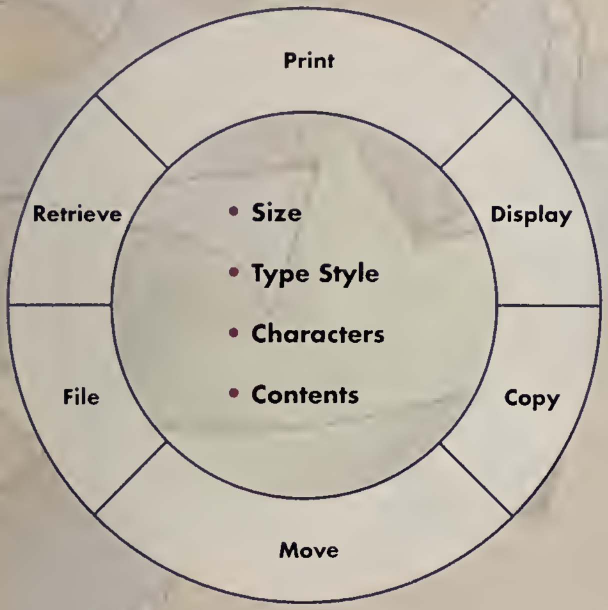
- flexibility
- timeliness
- development and implementation costs
- maintenance time and costs
- portability and compatibility in heterogeneous systems
- the ability for non-IS personnel to access information and customize information systems.



Source: International Data Corp.

In order of entry, software developers, Fortune 500 companies and finally the general population will drive the object technology market.

Object Composition



Source: Object Management Group

An object is composed of behaviors ("Display," "Copy," etc.) and data ("Size," "Capacity," etc.)

Procedural Programming

To readily exchange information, two applications must have a common interface. Unfortunately, the building of interfaces between existing systems is an expensive and difficult undertaking. The traditional method of software development, used for legacy systems, was based upon the line-by-line construction of software, which isolated data from procedures.

This method, popularized in the '60s, is called procedural programming. Procedural programming is based on the efficiency derived by separating the operations or procedures from the data on which those operations are performed. This segregation allows the same data to be operated upon by different procedures in order to achieve varying results required in several applications. It also eliminates the duplication of data to each program that may need it.

For example, the data might consist of a file containing a list of names. A set of procedures may be constructed that would arrange the list alphabetically. The same data could then be used by another program, or set of procedures, that would select from the list only those names that begin with the letter "D." The result would be a subset of the original list containing only those names that began with the letter "D." This approach reduced the need for each program to contain its own copy of the data and, therefore, eliminated a serious problem.

Along with allowing multiple uses for data, the procedural-based approach made certain that the expensive computing resource was controlled by one procedure at a time. It also required that each change be accompanied by the creation of a new program or a modification in the existing program. The result was maximization of the scarce, expensive resource, computing power, and the use of cheaper programmer power dedicated to modifying the software for each new request.

Combined with the ever-growing numbers of programmers, this constant tweaking of programs led to the belief that software was short-lived and transitory.

As programs became more complex, the size and interrelationship of procedures within them also increased. The result was the creation of what programmers called "spaghetti code." This moniker was affixed to large computer programs where the dependency and interrelationship among procedures created a maze-like complexity that made maintenance and enhancement very difficult and expensive.

The simple change of a few lines of code in such a million-line program might well have led to critical failures in seemingly unrelated parts of the program. A change that takes only a few hours to code may have taken months to debug. That is one of the principle reasons for the escalating cost of maintenance.

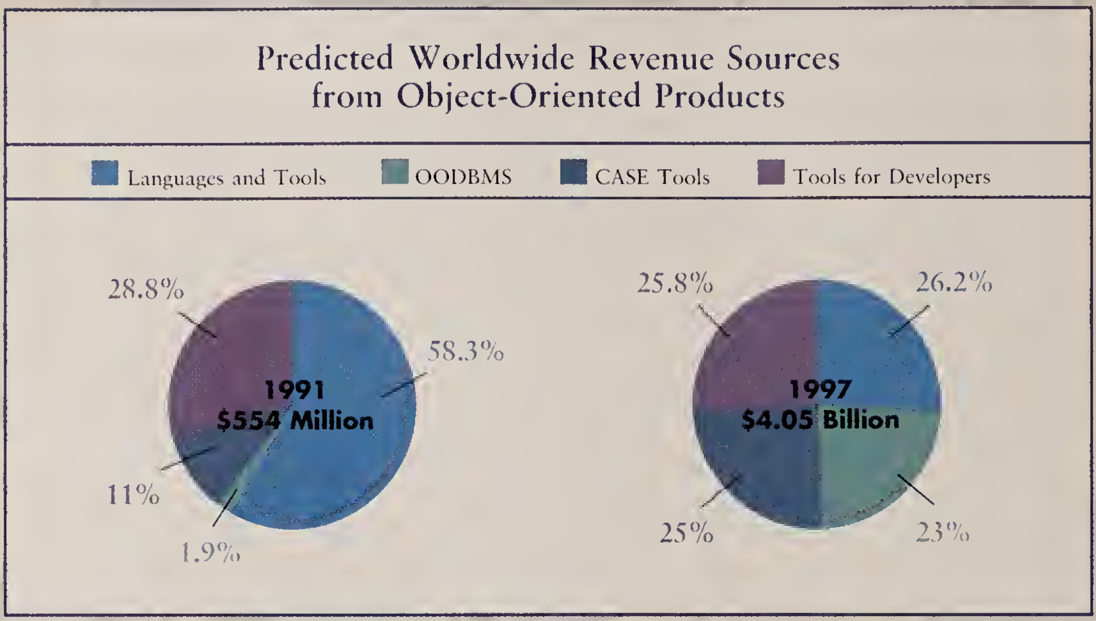
OT: The Next Step

OT encompasses many disciplines currently used in software development. As stated, it is not new, but rather the next logical step in the evolution of software design and engineering. OT development and product releases have been ongoing for almost 25 years internationally. In fact, the origin of OT dates back to work done in Norway in 1969. The majority of OT development has been conducted in research environments as computer scientists sought ways to model complex operations.

The guiding premise of OT is the belief that computer systems should function in a way that more closely models the common experience of objects in the everyday world.

> Object technology promises to provide component-level software objects that can be quickly combined to build new applications that respond to changing business conditions.

In traditional software development, designers decide on functions to be carried out. For example, in a traditional word processing application, a *print* pro-



Source: Ovum, Ltd.

Object-oriented database management systems are slated for explosive growth over the next four years.

cedure would take the file specified and print the document. The *print* command is specific to that word processing program and must function with the printer, operating system, hardware, and under the other parameters anticipated by the programmer when the program was written. This leads to problems when that environment changes and the program does not work as anticipated. There is a constant battle in traditional systems environments to ensure that all versions of hardware and software are current — or at least equally out of date — so that changes to the applications can be minimized.

In an object system, the software designer is not concerned with functions and procedures. Instead he or she decides which real-world objects the system should model. For example, in a word processing application objects called DOCUMENT or PAGE might be constructed. These software objects, sometimes called modules or components, contain both the procedures and data necessary to replicate their real-world counterparts.

> The problem is that, until the late '80s, little or no thought was given to making the results of one application transparently available to another application.

SOFTWARE ICs AND MESSAGES

The notion of an object as the basic building block of an OT system is similar to the idea of a computer chip in the hardware business. In fact, Brad Cox, an early OT pioneer, coined the term "software ICs" to draw exactly that analogy.

Objects can either be very small or extremely large depending upon the real-world object they are trying to model. And as in the real world, software objects are identified by a name. Objects can then be described by their properties and attributes. For example, a document object may have the name CWARTICLE. Its properties would be the ability to print or display itself on a variety of devices, and its attributes would be the date of its creation and the number of words it contains.

In addition, a software object has the concept of behavior similar to its real-world object. Thus, the object CWARTICLE responds to messages that ask it to print, display, file, copy or send itself to another location in the same CPU or across a communications network to another CPU.

This is the normal behavior we expect of the real-world article that we shuffle on our desks. The only way one object may communicate with another object is through the sending and receiving of messages. Messages between objects cause the receiving object to carry out a specific function. In an object application the message *print* would be sent to a document object, which would have its own procedures to print itself.

Adele Goldberg, founder of Parc Place and an early researcher of object-oriented languages, calls OT "the polite computer science" because of this use of messages. In order for an object to perform a function, a message is sent requesting that the object perform that function. In a traditional procedural system, the procedure takes control to ensure the function is complete. That is not, by comparison, very "polite."

To carry the example back to the real world, it is apparent that real-world objects can and do perform a variety of actions: moving, replicating, lifting, jumping, etc. In our example, CWARTICLE, someone

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could pick up the paper article, move it from one place to another, give it to a colleague or copy it on a copier.

To model these actions of the real world in a computer, the designers of Simula, the first object-oriented language, introduced the concept of a message. A message is composed of the name of an object and the behavior that the object is capable of performing. The object that initiates the message is called the sender — or sometimes the client — and the object that receives the message is called the receiver or server.

If additional information is required, it is contained within the message as a parameter. Parameters are the detailed instructions or data that are necessary for the receiver object to carry out the request.

In the real world, a person could pick up the telephone and dial the name of a receiver, for example, "0" for the operator. The message is, "Will you look up a number for me?" The response is "No." Local operators do not look up telephone numbers; the information operator does. In the OT system the same sequence may occur if an object requests a behavior from another object that it is not able to perform.

The use of messages is a key concept in an OT system because all actions are initiated at the request of messages, and all responses are conveyed in the form of messages. Messages allow objects to be combined on the basis of their declared behavior and to have that behavior invoked by any object capable of sending a message and receiving the reply or return values. Because of the central role messages play, a great deal of attention is placed on providing easily accessible, open interfaces as part of any object.

A real-world example of this system can be portrayed by viewing the process of calculating and paying taxes. A typical citizen, as a tax paying object, needs to have taxes calculated. That person sends a message to a tax preparer or accountant object asking for a behavior or service.

The message includes the information pertinent to the preparation of taxes: W-2, family status, deductions, etc. The return value or response, from the tax preparer object, is a completed tax return. Now the tax preparer, formerly the receiver object, becomes a sender object. In this exchange the tax preparer addresses (name), an envelope (message), which contains a bill for services rendered (parameters). The citizen, as the receiver object, responds with a check.

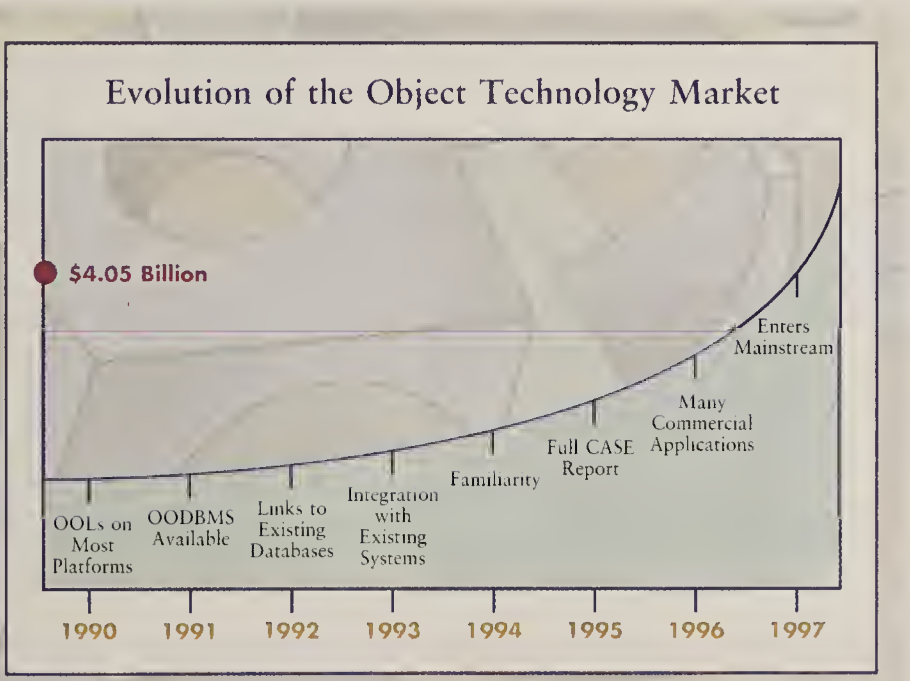
The important point in this example is how, in the real world, the roles of sender and receiver are constantly changing. The same is true in an object-oriented system. After an initial message that a tax preparer is unavailable, the citizen could send the same message to another, and so on, until a positive response is received. It is this ability to model the complexity and variety of the real world that makes OT a better technical solution for developing integrated enterprise information systems.

CLASSES

Also, as in the real world, software objects can be grouped into classes. The American Heritage Dictionary defines class as "a group whose members have at least one attribute in common." In the real world, sports teams, corporations and supermarkets are examples of classes that fit into a hierarchical structure. For example, supermarkets fit in a class structure that might be called retail stores. This class might also include department stores as subclasses.

If someone attempts to enter "whale" into this class, it could be seen intuitively that a large seagoing mammal does not have any shared attributes with retail stores. The advantage of grouping objects into classes is the richness of information that is available for any object by its inclusion in, and relationship to, the hierarchy of a class structure.

Software objects similarly can be grouped into classes based on the shared properties of the individual objects. A class contains all the methods and attributes that are common to all members of the class. Software objects could, for example, be grouped into a hierarchy consisting of the primary class DOCUMENTS, and subclasses, LETTERS and ARTICLES.


Evolution of the Object Technology Market

Source: Ovum, Ltd.

Object technology will become common in information systems by 1997.

Therefore, the object CWARTICLE is an instance of the class ARTICLES and it shares all of the properties of the superclass DOCUMENTS.

Finally, just as in the real world, classes can be organized into a hierarchy. Once objects are grouped into classes it is possible to see that attributes are inherited by subclasses from higher classes. Subclasses may inherit attributes (data and procedures) from higher classes in the hierarchy, known as superclasses.

In an object system, software designers are not concerned with functions and procedures. Instead, they decide which real-world objects the system should model.

DOCUMENTS is a superclass that includes the subclasses LETTERS and ARTICLES. These subclasses inherit attributes of the documents class but add special features of their own (e.g., address, special format). For example, a letter to Fred inherits all the attributes of the superclasses DOCUMENTS and LETTERS, then adds the unique attribute of being addressed to Fred.

Each instance of a class will have its own unique name and location within the system. Inheritance allows objects to efficiently represent the large amounts of redundant information that is common to all the objects in a class. It does this simply by listing an object's relationship to a class.

While inheritance can be a powerful feature of an object-based system, it can also introduce implementation issues if that system is distributed over a wide network of computers. For example, a very large class structure with many subclasses can be difficult to manage over a large network.

In simple terms, it may be simpler and safer to replicate classes in local nodes on a network even if that means duplicating the same information in many places. Then if a change is made in a superclass, all effected subclasses can more easily be found and updated.

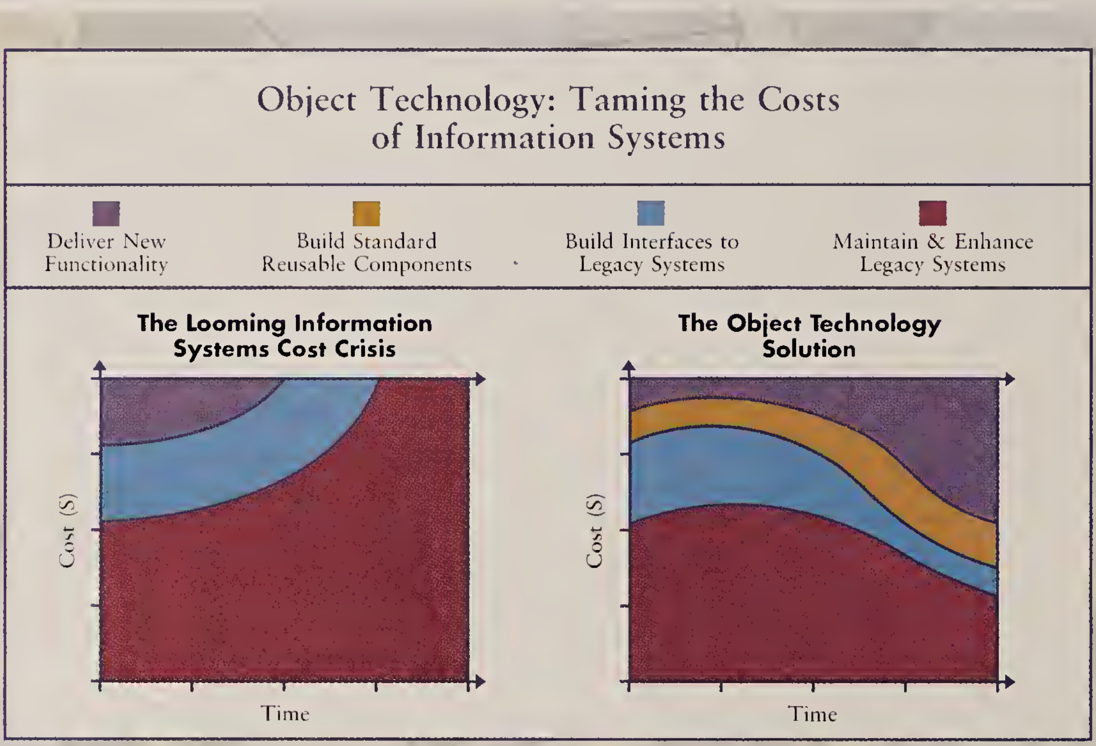
In the report "Objects in Use: Meeting Business Needs," produced by Ovum, Ltd., the following explanation is given for the internal workings of an object:

"The mechanism for packaging data and procedures is known as encapsulation. Think of an object as a capsule, in which data is stored at the center. Access to the data is via the methods, which in turn are accessed by messages from the consumer (other objects or a user). The surface of the capsule is the interface with the consumer. It consists of public information containing the names (or selectors) and the definitions of the methods.

"To initiate a method, a message is sent to the object, which compares it with its list of selectors. If it finds a match, the corresponding method is activated and the appropriate response is sent to the consumer. Otherwise an error message is sent."

The flexibility of an object-based system comes from the capacity of objects to make available a public interface, while hiding the internal data and procedures that make up the core of the object. In a system constructed from products produced by many vendors, it then becomes possible to have these diverse products work together through interaction at the object interface level without knowing any of the inner workings of any other object on the system.

The key supporting



The Looming Information Systems Cost Crisis

The Object Technology Solution

Source: US West Advanced Technologies

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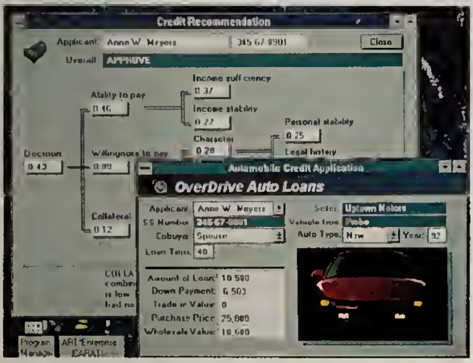

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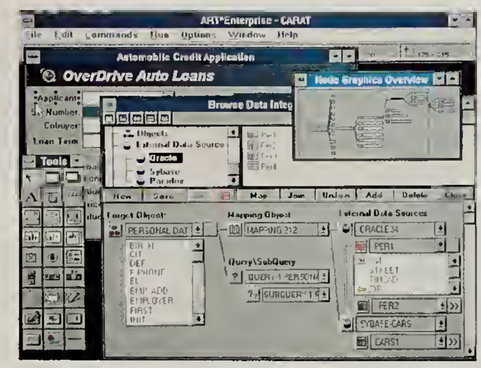

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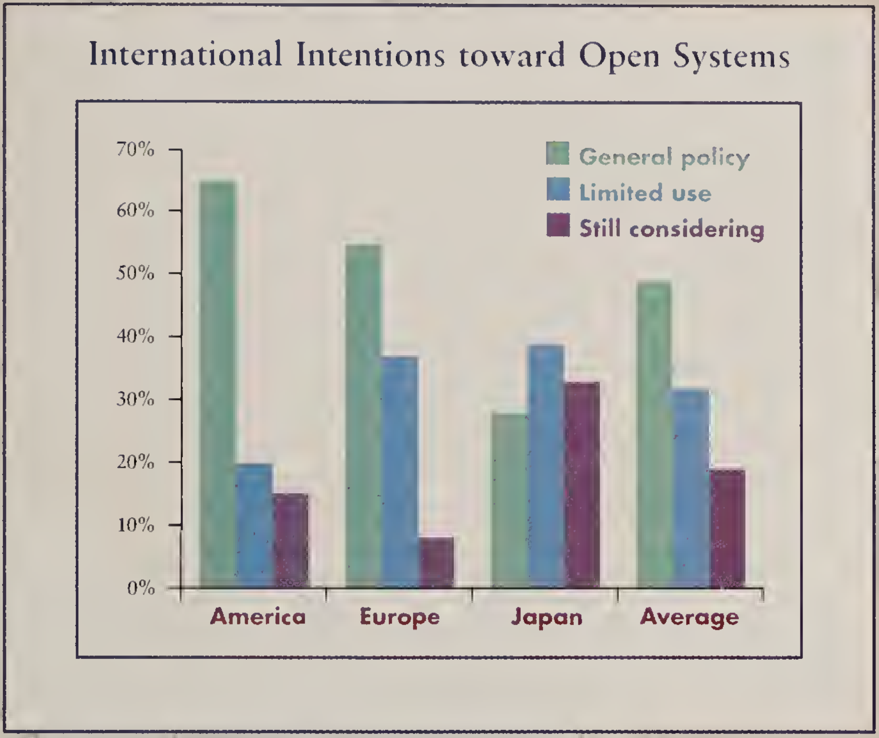
notions of encapsulation, attributes, methods, messages, inheritance and interfaces describe how objects are constructed and how they function. The last major term to understand is polymorphism.

Again, this OT concept is modeled on the real-world way in which the behavior of objects is described or initiated. In the example of the class, DOCUMENTS, the *print* command is a polymorphic command: a single command that may be performed in a different manner by each object, yet with the same end result.

Each object that receives the *print* command will, if its behavior allows, print itself. Some objects will require a common character printer. Other objects, such as pictures, might require a special output device, perhaps a laser printer or plotter.

After receiving the polymorphic print message, it is up to the object to determine if it can comply. In a traditional system, the programmer would have to take into consideration all the necessary parameters that would be required for each object to be printed, and write separate programs for each type of document.



Source: X/Open

The U.S. and Europe far outstrip Japan when it comes to implementing open systems.

OT Covers All Disciplines

It is important to remember that OT covers all the disciplines that contribute to the conception, production and use of software. A confusing point for many people when they are first introduced to OT is their need to equate it to an existing specific software technology, e.g., database, operating systems, language, etc.

Because a computer language is an identifiable and important contributor to creating computer software, much discussion is focused on OT-based languages. Two of the more popular languages are SmallTalk and C++. There are also a number of other languages that adhere to the OT paradigm.

Languages, operating systems, object bases, user interfaces and network interfaces are all part of the object paradigm. In meeting the need for wide-scale integration, OT provides a uniquely versatile and useful perspective for systems designers. A central premise of OT is the notion that all objects, whether local or remote, should communicate through the sending of messages. This puts tremendous emphasis on objects to conform to a standard interface structure for formatting, sending, receiving and responding to these messages.

In attacking the need for wide-scale integration, object technology provides a uniquely versatile and useful perspective for systems designers.

Any object that can properly format and respond to messages can participate in an OT system without exposing the inner workings of the object. As a result, widely distributed objects may be assembled from proprietary, custom and/or standard objects without the need to be involved in the details of each object's construction and operation. This is sometimes referred to as information hiding.

In his book, "Object-Oriented Technology: A Manager's Guide," David Taylor discusses encapsulation and information as two of the key features of OT:

"The encapsulation mechanism of object technology is a natural extension of the information-hiding strategy developed in structured programming. Object-oriented technology improves on this strategy with better mechanisms to pull the right kinds of information together and hide their details more effectively."

By expanding the idea of information hiding with OT, it becomes possible to build more complex systems as each object retains its own data and methods, uncorrupted and incorruptible by the other objects in the system.

EMERGING OT PRODUCTS

The movement to adopt OT principles into the development of many different types of products is escalating. In 1991, Ovum Ltd., published "The Object Technology Sourcebook." That report identifies 157 products and 106 suppliers. A year later, an update of that report shows an increase in products to 302, and suppliers to 191.

The current market for OT-based products can be divided into four major segments:

- languages and programming tools
- developers' toolkits
- object-oriented databases
- object-oriented CASE tools.

LANGUAGES AND PROGRAMMING TOOLS

The largest segment of the current market for OT-based products is languages and programming tools, which according to Ovum, represents 42% of the market. Products in this area include language compilers for C++, SmallTalk, Common Lisp Object System (CLOS), Eiffel, Ada and Objective-C, as well as extensions to Pascal and Modula-2.

Products in this category are available from a variety of vendors. Increasingly, the trend in this group is to offer the language compilers with associated de-

Glossary of Terms

Abstract class: A class that can be used only as a base class of some other class; no objects of an abstract class may be created except as instances of a subclass. An abstract class is typically used to define a common interface for a number of subclasses.

Abstraction: The logical form that analogous things have in common. Also, the process of identifying the characteristics that distinguish a collection of similar objects; the result of the process of abstraction is a type. (synonym: concept, type)

Architecture: The structure or ordering of components in a computational or other system. The architecture of a particular application is defined by the classes and the interrelation of the classes. At another level, the architecture of a system is determined by the arrangement of the hardware and software components. The terms "logical architecture" and "physical architecture" are often used to emphasize the distinction.

Class Hierarchy: A characterization of the inheritance relations between classes. A class hierarchy is typically shown as a directed acyclic graph or tree. The nodes represent classes and are connected by arcs to indicate inheritance relations. In the case of multiple inheritance, the structure is actually a lattice.

Class-Based: Any method, language, or system that supports abstract data types and requires that every object is an instance of an abstract data type or class. C++ is an example of a class-based implementation language.

Coupling: A description of the interdependence of classes. Two classes are tightly coupled when there are inverse or client-server relations between them. Decoupling occurs when neither class depends on the other for a requested service.

Embedding: Definition of an object that contains a non-object value. The purpose of embedding is to enable software entities (i.e. applications) to operate in an object-oriented environment.

Encapsulation: The characteristic that an object is a discrete unit of data with a set of permissible operations that controls access or modification of the values. Encapsulation is the language mechanism by which external aspects are separated from the implementation of an object. (synonym: information hiding, data hiding)

Inheritance: The language mechanism that allows the definition of a class to include the attributes and methods defined for another more general class. Inheritance is an implementation construct for specialization relations. The general class is the superclass and the specific class is the subclass in the inheritance relationship. Inheritance is a relation between classes that enables the reuse of code and the definition of a generalized interface to one or more subclasses. (synonym: class inheritance, derivation)

Interface: The set of requests that applies to a class. (synonym: public interface, protocol) velopment tools as part of a complete development environment.

Developers' Toolkits

Developers' toolkits account for the next largest part of the OT market at 38%. Ovum projects this segment to continue its recent rapid growth by increasing at a 28% rate between 1992 and 1997. Developers' toolkits cover a variety of products from communication-level interfaces to graphical user interfaces (GUIs).

These products are designed to develop a program that enables a developer to easily do one of two things. The first is interfacing an application to a distributed environment, such as the HyperDesk Distributed Object Management System. The second is developing a graphical screen through a product, for example, Open Interface from Neuron Data.

By providing developers with higher level description languages and reusable components, products in this category give developers an easy and cost effective way to begin producing object-oriented systems.

An important component in this category is the relatively new area of end-user tools. This element is important because organizing and analyzing the increasingly large amounts of data that computer systems are capable of collecting is a key problem.

An early product by Hewlett-Packard called "New Wave" produces a visual environment where information contained in one program can more easily be moved to another application. New Wave offers knowledge workers the ability to encapsulate

Method: The specific implementation of an operation for a class; code that can be executed in response to a request. A method can extend or override the behavior defined in the operation. In many systems, the selection of a specific method to respond to a request can be done at compilation or execution. A method is an implementation of behavior of a type.

Model: A representation of a problem or subject area that uses abstraction to express concepts. A model is often a collection of schemata and other documentation.

Module: A collection of objects, methods, and classes that collaborates to provide a subset of the functionality of an application. Modules can retain their own state and share information with the rest of the application.

Object: Anything to which a type applies; an instance of a type or class. An instance of a class is comprised of the values linked to the object (object state) and can respond to the requests specified for the class.

Object-based: Any method, language or system that supports object identity, classification and encapsulation. An object-based system does not support specialization. Ada is an example of an object-based implementation language.

Object-oriented: Any method, language or system that supports object identity, classification, encapsulation and specialization. C++, Smalltalk, Objective-C and Eiffel are examples of object-oriented implementation languages.

Object type: An abstraction (predicate) that can apply to a collection of objects; the logical form of a collection of analogous objects. An object type is an idea or notion that can be determined to apply, or not to apply, to an object; it classifies objects according to meaningful properties and behavior. (synonym: type, concept)

Object request broker (ORB): A software mechanism by which objects make and receive requests and responses.

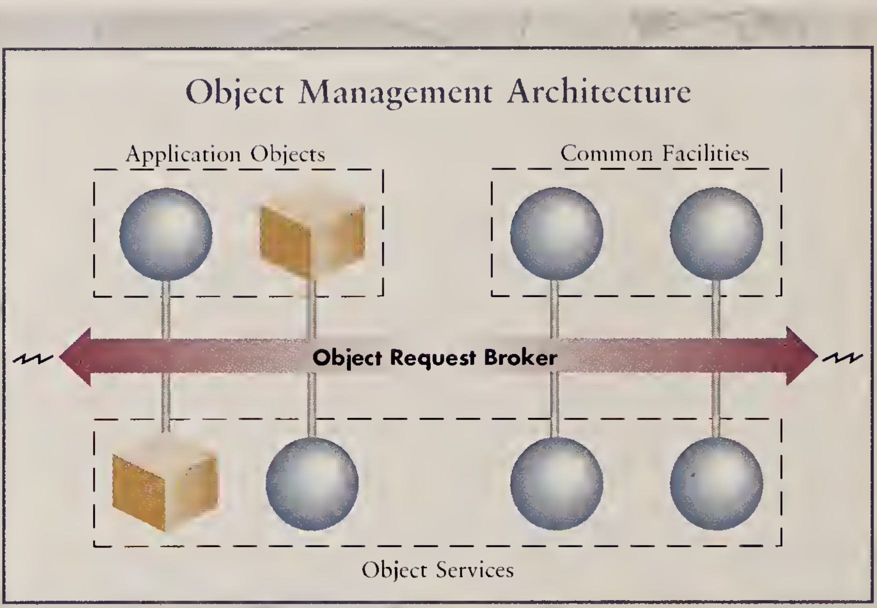
Polymorphism: A request-handling mechanism that selects a method based on the type of the target object. This allows the specification of one request that can result in the invocation of different methods depending on the type of the target object. Most object-oriented languages support the selection of the appropriate method based on the class of the object (classical polymorphism). A few languages or systems support method selection based on other characteristics of the object, including values and user-defined defaults (generalized polymorphism).

Request: An event that is the invocation of an operation. The request includes the operation name and zero or more actual parameters. A client issues a request to cause a service to be performed. Also associated with a request are the results that can be returned to the client. A message can be used to implement (carry) the request and any results.

(From "Glossary of Object Oriented Software," SEMAPHORE, MASS., 1993)

DOS applications in a manner that has them appear on a screen as New Wave objects.

Information in one application may also be linked to another. For example, it is possible to have a spreadsheet appear in a document produced by a word processing program. The value of this linking process is found in the fact that the document and spreadsheet may each be developed and updated within their respective programs, and combined only for display or printing.



Source: OMG

The Object Management Architecture shows all the aspects of an object-oriented environment connected via the Object Request Broker, which passes messages throughout the system.

Hypertext is an older system that approaches the same issue another way. Within Apple's HyperCard program links can be created to key words that explain terms, display pictures and produce effective interactive navigation through complex information. Each card in a hypercard stack has many, although not all, of the characteristics of an object.

Object-oriented Databases

Object-oriented database management systems are one of the most interesting and rapidly growing segments of the OT market. A number of companies, including systems vendors like Digital and HP, and start-ups such as Object Design, Servio, and Objectivity, have all produced products.

These products, dubbed "Objectbases" by John Rymer of the Seybold Consulting Group, fill an important need by storing complex objects as a single entity. The objectbase products allow objects to be stored, retrieved and shared in much the same way as data is stored in a relational database management system. This product category, while only comprising 8% of the market in 1991, is projected by Ovum to grow to 24% by 1997. This 114% annual growth rate will produce a market value of over $1 billion.

The value of an objectbase, as opposed to a database, for storing objects, is best described by David Taylor:

"Object databases offer a better way to store objects because they provide all of the traditional database services without the overhead of disassembling and reassembling objects every time they are stored and retrieved. Compared with an object database, storing complex objects in a relational database is tedious at best. It's like having to disassemble your car each night rather than just putting it into the garage!"

Object-oriented CASE Tools

Over the next few years, Ovum expects to see a shift from proprietary CASE implementations to those based on the object paradigm. This area has lagged in growth from earlier projections. OT-based CASE tools will have to emerge as a viable product category to address the wide-scale development of large systems. This category also includes those tools that are methodological in nature.

Commenting on this phenomenon in the September 1990 issue of *BYTE* magazine, Ed Yourdon states, "Considering the transition into object-oriented methodologies, I would say that this is going to be a big one in the nineties, as a replacement of the pure process-oriented methodologies, like structured analysis and structured design."

Over the next few years more system- and user-oriented products will begin to emerge as significant contributors to the object revolution. In the summer of 1992, IBM and Apple surprised the industry with the formation of Taligent. The mission of this new company is to provide a new object-oriented operating system with software adapters to help link existing applications to the new environment.

Microsoft has also come out strongly in favor of object technology with indications that their new Windows NT operating system will support objects.

Exploring the OT Requirements

In January, 1992, X/Open, an international open systems consortium, undertook a research study called the "Xtra World Survey on Open Systems." The goal of this survey was to focus on worldwide open systems opinion leaders. The survey was mailed to over 1,000 screened open systems influences and

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decision makers.

The survey drew 381 responses from Europe, the United States and Japan. The results indicated the top five strategic priorities for the implementation of open systems:

- interoperability across heterogeneous systems and networks
- an overall architecture for enterprise open systems computing
- heterogeneous, networked database access and management
- integrated open and proprietary network management
- open systems access to proprietary mainframe applications.

The survey results echo many OT objectives, including the need to integrate existing systems into open heterogeneous enterprise systems. Any enterprise system must have highly functional autonomous parts, as well as an open architecture that encourages the easy movement of information. The architecture, to be open, should be vendor-independent and capable of connecting to the existing installed base of proprietary systems.

OT Experts on the Future of OT

In January and February 1993, the Object Management Group and TechVantage, a New York-based market research firm, conducted another survey. The purpose of the study was to interview a number of leading system designers, systems architects and OT leaders on their views of OT's emergence as a major force over the remainder of the decade. This survey was the first part of a two-stage survey.

The first stage consisted of 28 detailed interviews of screened and selected technologists. Those surveyed included senior technical people from major U.S. and European corporations. Academicians and industry analysts were also interviewed. In the second phase, 200 prospective end-users are to be surveyed. The purpose of this research is to explore the similarities and differences of expectation for OT between the two groups.

The next five years will bring significant changes to the production of applications as object-oriented components become increasingly available.

Based on results from the first-stage interviews with the technologists, OT will:

- experience increasing acceptance over 10 to 20 years as systems become fully integrated
- have a profound impact on application development
- move from applications that require complex data/object manipulation such as CAD and the integration of applications, into enterprise computing systems.

The experts are divided in their opinions of the three currently most visible manifestations of OT: objectbases, languages and CASE tools. The discussions on objectbases unveils three key points:

- objectbases will coexist with DBMSs because they functionally address different problems
- initial acceptance of objectbases is currently for highly complex structures like CAD drawings
- the possibility that object-oriented operating systems and extension to RDBMSs may encroach on objectbase use through extending object-oriented file systems.

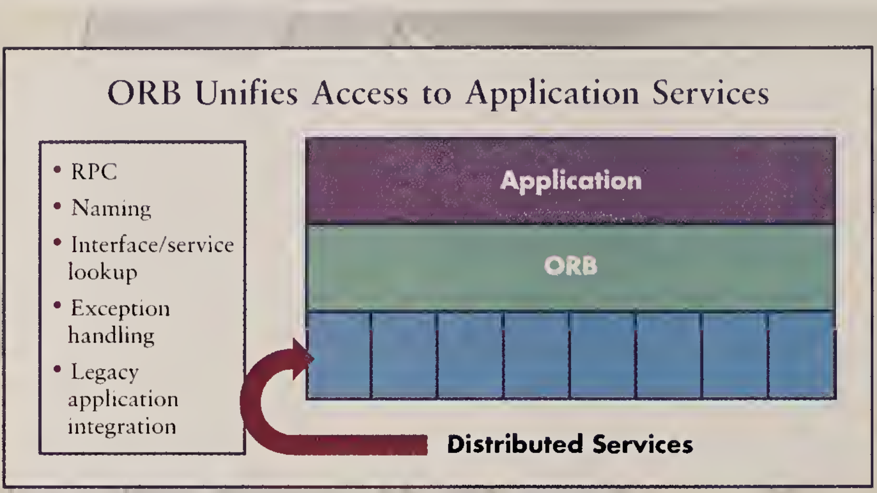
The respondents see current languages having limitations that would be alleviated over time as future releases become more robust. Asked about OT CASE tools, the experts predict adoption and integration of the OT paradigm into CASE products within five years.

Because of the emerging nature of object technology, many survey respondents see the potential for "hype" that, unsupported by products, could cause a backlash from potential buyers.

A common theme in the responses is the belief that the next five years will bring significant changes to the production of applications as object-oriented components become increasingly available. Many see a likely change in software distribution methods to support the demand for objects of varying granularity. Such a new distribution channel would supply commercial and in-house developers with objects capable of being assembled into applications.

While none of those surveyed feels that OT will fizzle, they think there are potential problems. Because of the emerging nature of OT many see a potential for "hype" that, unsupported by products, could cause a backlash from potential buyers. If this happens they think the use of OT would "go underground," meaning that it would still be used by developers but that users would be largely ignorant of OT architectures and components.

When asked about the timing of OT adoption, the majority of respondents say that significant product introductions are still several years away. However, they predict a vigorous market in OT components, CASE tools, operating systems and applications within the next five years.


ORB Unifies Access to Application Services
• RPC
• Naming
• Interface/service lookup
• Exception handling
• Legacy application integration
Application
ORB
Distributed Services

Source: OMG

The Object Request Broker (ORB) acts as a high-level interface, hiding details of communications and services from the application developer.

OT Standards

While OT provides many benefits for vendors and users of software technology, it does require a level of coordination, particularly at the architectural and interface levels. The software industry has attempted to address the issues of incompatibility between vendor products by establishing standards. The Object Management Group, founded in April 1989, is a non profit, member-sponsored organization dedicated to establishing open standards in the area of OT.

Over the last four years, OMG has grown to represent over 300 member companies. Central to its mission is the belief that for OT to be successful, an open architecture supported by open interfaces must be widely available.

OMG provides a reference architecture with terms and definitions upon which all specifications are available under fair and equitable terms. OMG's Object Model defines a partial model for computation that embodies the key characteristics of objects as realized by the submitted technologies. Within the Object Model, it is at the interface level where de facto standards are described.

The Object Management Group provides a reference architecture with terms and definitions upon which all specifications are available under fair and equitable terms.

OMG also publishes industry guidelines in its "The Common Object Request Broker: Architecture and Specification (CORBA)." This publication is offered for users of commercially available object-oriented systems. It focuses on the areas of remote object network access, encapsulation of existing applications, and object database interfaces.

W. Roelandts, Manager, general computer systems organization with Hewlett-Packard states, "I believe OMG's Common Object Request Broker Architecture specification will be one of the main standards in distributed object technology for two reasons. First, there are over several hundred companies that support CORBA. Second, CORBA is there; the fact that it is a standard that people are using today dwarfs any potential shortcomings it may possess."

Conclusion

A key point in understanding the change to OT is made by Chris Stone, president of the Object Management Group, when he says, "The change to object technology is 80% psychological and 20% technological." This need to rethink software systems from the standpoint of assembling pretested, reusable components, rather then producing thousands of lines of new code is the significant change IT staffs must face.

OT requires a different view of analyzing problems and provides a powerful and efficient means of enabling solutions. It offers new tools and flexibility, but also has a requisite learning curve and migration time. OT can be a valuable tool in providing easy information access to all levels of people. This is demonstrated by the fact that it is currently reducing IS development time and maintenance at many user sights.

The transition to OT is like learning to swim. You either jump right in with both feet or test the waters at a gradual pace. Either method may be appropriate, depending on the resources, organizational structure and embedded software needs of the company.

The benefits of OT are irrefutable. The road that must be traveled is clear. Now is the time to lead, follow or get out of the way. ▸

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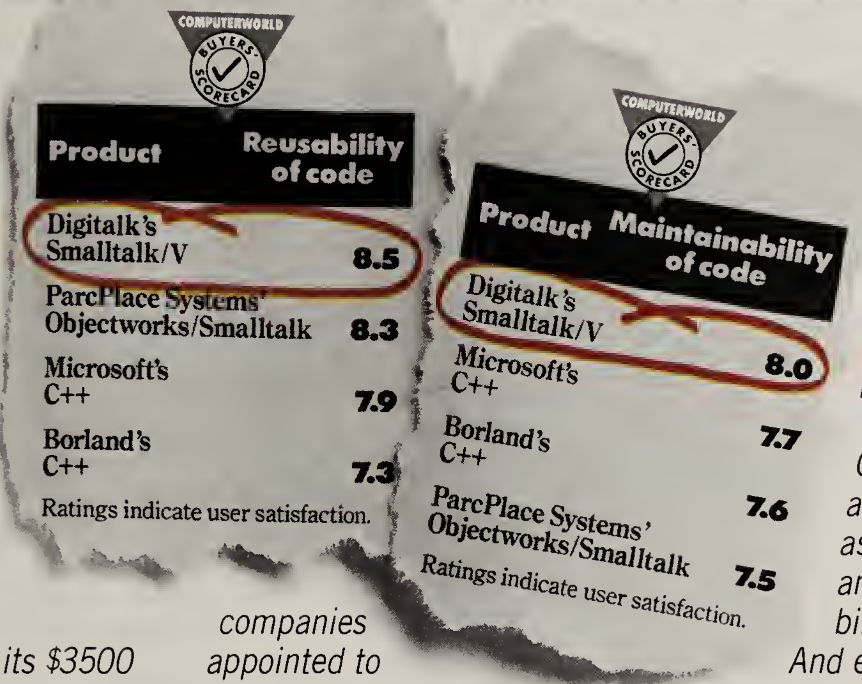

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Product	Reusability of code
Digitalk's Smalltalk/V	8.5
ParcPlace Systems' Objectworks/Smalltalk	8.3
Microsoft's C++	7.9
Borland's C++	7.3

Ratings indicate user satisfaction.

COMPUTERWORLD BUYERS' SCORECARD

Product	Maintainability of code
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Microsoft's C++	7.7
Borland's C++	7.6
ParcPlace Systems' Objectworks/Smalltalk	7.5

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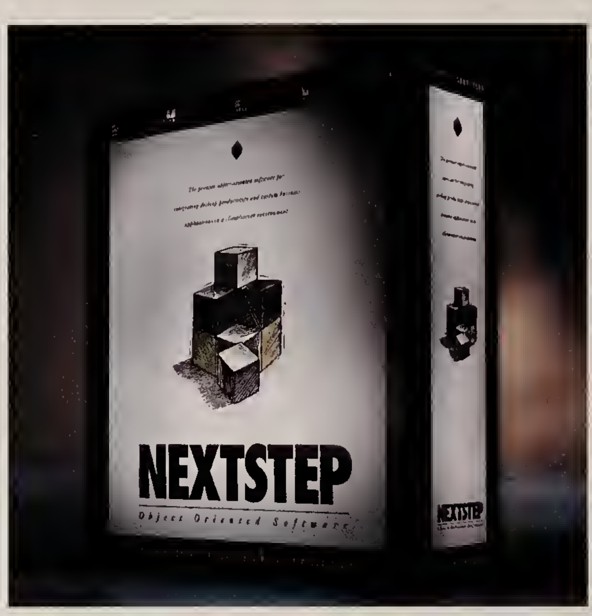

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Modems, bulletin boards and other tools of Satan

Rob Rosenberger

The mass media will soon kill bulletin board services (BBS) as we know them, yet it will never stand trial for the murder. Society continues to applaud it for slaying the evil beast of BBSs.

Reporters have already destroyed the spirit of the word "hacker." A monicker the computing community once wore with pride now brands you as a teenage geek who writes viruses and breaks into defense computers.

Go ahead, Mr. 40-year-old, walk up to someone and describe yourself as a computer hacker. That person will treat you like a repugnant teenage video game addict — or call you a fool for thinking you know as much as some dangerous, pimple-faced hacker.

What happened to hackers will soon happen to BBS users, thanks to the mass media. Society will cast you out for "hanging around on bulletin boards." BBS use may even corner you into a murder rap.

Seriously. Rumors abound right now about a cult murder in Phoenix supposedly linked to a BBS. A satanic cult, of course. Nebraska police arrested two BBS users not long ago for the kidnap, rape and murder of a university student.

The killers probably hung out at bars, too, but does that make news? No. Toss in the fact the guys logged onto BBSs — whoa, you've got one hell of a murder story.

Katherine Mahoney

A recent episode of *Law and Order* tantalized TV viewers with the fictional story of a teenage hacker bent on revenge. His computer virus creation killed two patients who relied on the medical analysis of an infected program. Naturally, BBS users helped the hacker write his virus, and he infected the medical computer via modem.

What do parents usually hear about BBSs? They listen as some TV reporter describes how he "pierced the underground" to find all sorts of stuff their son taps into on a daily basis — pornography, snuff software, details on how to read President Clinton's E-mail and phone numbers for (God forbid!) the National Rifle Association's BBS.

Unfortunately, the mass media doesn't care about many important contributions made by BBS users. Numerous companies, for example, run BBSs so their employees can telecommute. Defense Department BBSs transmit reports, make software available to field units and provide access to personnel records.

Do you consider disk compression a "new" technology in DOS 6.0? You can thank BBS users for it — they've used compression programs for more than a decade. BBSs, more than anything else, advanced the state of the art in compression software and modem throughput speeds during the 1980s.

BBSs have also advanced the state of the art in antivirus software; indeed, every major antivirus company runs a BBS for its users.

I could go on about the other important benefits of BBSs, but none of them matter. Reporters have branded BBSs as a conduit for satanic cults, organized crime, corporate espionage, treason, viruses — you name it. The moral of each story: Never trust anyone who owns a modem.

Rosenberger is a 30-year-old computer hacker who owns four modems. He regularly logs onto the NRA's bulletin board.

Spooky days for IBM, DEC – and their users

FIRE WATCH *by* John Gantz

Welcome to the witching hour. In Wall Street terms, that's the last hour of trading on those rare days when stock options, index options and index futures all come due at the same time, wreaking havoc with programmed trading. In that last hour, the market can go through wild, unpredictable swings.

On our street, it means a time like now — when so many contradictory trends are at work that the immediate future is unknowable. Small events, such as a judicial decree on who can make 486 chips, can have a major impact on the future of the industry. The witching hour ushers in what the experts call "positive feedback economics" — also known as uncertainty.

One of the more nerve-racking worries for users is the viability of key vendors. If IBM's stock can drop below $50, anything can happen. The industry has no firmament. Or what it had is crashing down.

So, how *can* you pick vendors in this unsettled time? What distinguishes the likely survivors? Market share helps, particularly the near-monopoly kind Microsoft and Novell have in software and Hewlett-Packard has in laser printers. Cash is also useful, as are lightning-fast decision-making and luck.

Most of all, though, vendors need real-time monitoring of customer needs — a direct pipe to customers — to follow the twists and turns of market demands. This requires not just research, but a total outward focus — each employee thinking from the customer's point of view every minute of the day.

And that is why the witching hour is so dangerous to our two biggest computer companies: They are so focused on their own internal organizations, cultures and infrastructures that the market is passing them by.

Customers? What customers?

At a meeting with an IBM exec last week, for instance, I asked how many meetings a year he thought the average IBM employee had with customers, analysts or reporters, hoping to compare IBM to an outwardly focused company such as Apple. He admitted that there was no comparison. Plenty of IBM employees have never even met a customer.

A new CEO may help change the culture, but that change will proceed with all the speed of a blood transfusion through a cocktail straw. An IBM that once officially aspired to be a $100 billion business by 1990 will now be lucky (very lucky) to hit it by 2000.

And look at DEC, which may be even more inwardly focused right now. Yes, Mr. Palmer is making strides to rationalize the company, but to do so he has to change job functions, organizational charts and personnel deployment. Employees in the midst of that kind of upheaval often have other things on their minds besides customer welfare. Of the last dozen industry-related conversations I've had with DEC employees, six have ended up on the topic of job prospects. Resumes are shipping faster than Alpha chips.

When favored suppliers focus inward, users have to worry about not only long-term security but also immediate fallout. New sales representatives appear who don't know the account. Product design quality can become variable, and there is always the nagging question of whether the tailspin will continue. Technology choices have to be defended more rigorously.

I'm not saying these companies are goners; they still have plenty of positive attributes. But the next several months are not going to be an easy ride for anyone, including customers.

Gantz is senior vice president of International Data Corp., where he is responsible for all research and consulting in desktop automation and workgroup and office computing.

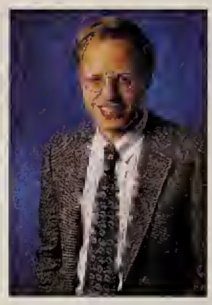
Commentary

Charles Babcock

Object lessons

Developing business systems using an object-oriented approach realizes many of the benefits and savings that other software development methods have only promised.

Object-oriented designs map more closely to the realities of the business world. Products, customers and processes can all be objects, and the business rules that govern them can be encapsulated in the object's code.



Object-oriented systems require fewer lines of code. They are more modular, so fewer things need to be changed when business conditions change. And they are composed of chunks of reusable code, although this latter gain is more difficult to achieve than object-oriented proponents allow.

These claims aren't based on texts or academic theories but on field reports from early implementors. Many of these pioneers adopted an object-oriented approach after concluding they could not do what they wanted to do with a procedural system, even though the whole development staff was schooled in Cobol, C and Fortran. For many it was difficult mastering C++ or Smalltalk and the new way of thinking that object-oriented requires, but the consensus was that the adjustment was worthwhile.

Working examples

At the recent Seybold conference in Boston, one IS director after another explained how he or she had produced a system on deadline and under budget while climbing a steep learning curve. Proponents included representatives of Citibank, Federal Express, Deere, CSX Transportation, Electronic Data Systems, Eastman Kodak and Southern California Gas.

All in all, it was powerful testimony.

Southern California Gas built a gas purchasing system in 5,125 days of programmer time compared with 8,130 days for a Cobol CICS system. The system runs under OS/2 on a PC LAN instead of an IBM mainframe. The labor cost came to $1.1 million compared with an estimated $1.76 million for a CICS Cobol system, a 37% savings, said Anne Estrada, senior computer analyst on the project.

CSX Transportation, the railroad conglomerate, built a locomotive management system that tracks the movements of train engines on a map of the Southeast. Dispatchers can use the drag-and-drop convention to move engines around. CSX estimates it has saved $24 million a year through a 3% gain in locomotive productivity realized by the system. Art Masson, director of transportation systems development, said it would not have been possible to develop such a system on a mainframe.

Although Masson was concerned about getting projects done on time, in one instance he found that programmers caught up to where they would have been with a procedural language in three to seven months. After that, the work moved more quickly because "you don't have to develop as much code."

For most parties, learning the ropes frequently requires calling in outside consultants, particularly in the design phase. Object-oriented methodologies are still loosely defined, so success in using them depends in part on the skill and discipline of the user.

Once learned, however, a system design stemming from object-oriented analysis "does mirror the business," said Rick Wohleber, IS managing director at Federal Express, where package tracking and other functions are moving into object-oriented systems.

As more commercial users plunge into the field, object-oriented development is likely to adopt more standard methods and procedures. With the right amount of discipline, the promise of object-oriented can be made real.

Babcock is *Computerworld*'s technical editor. His MCI Mail address is 575-2737.

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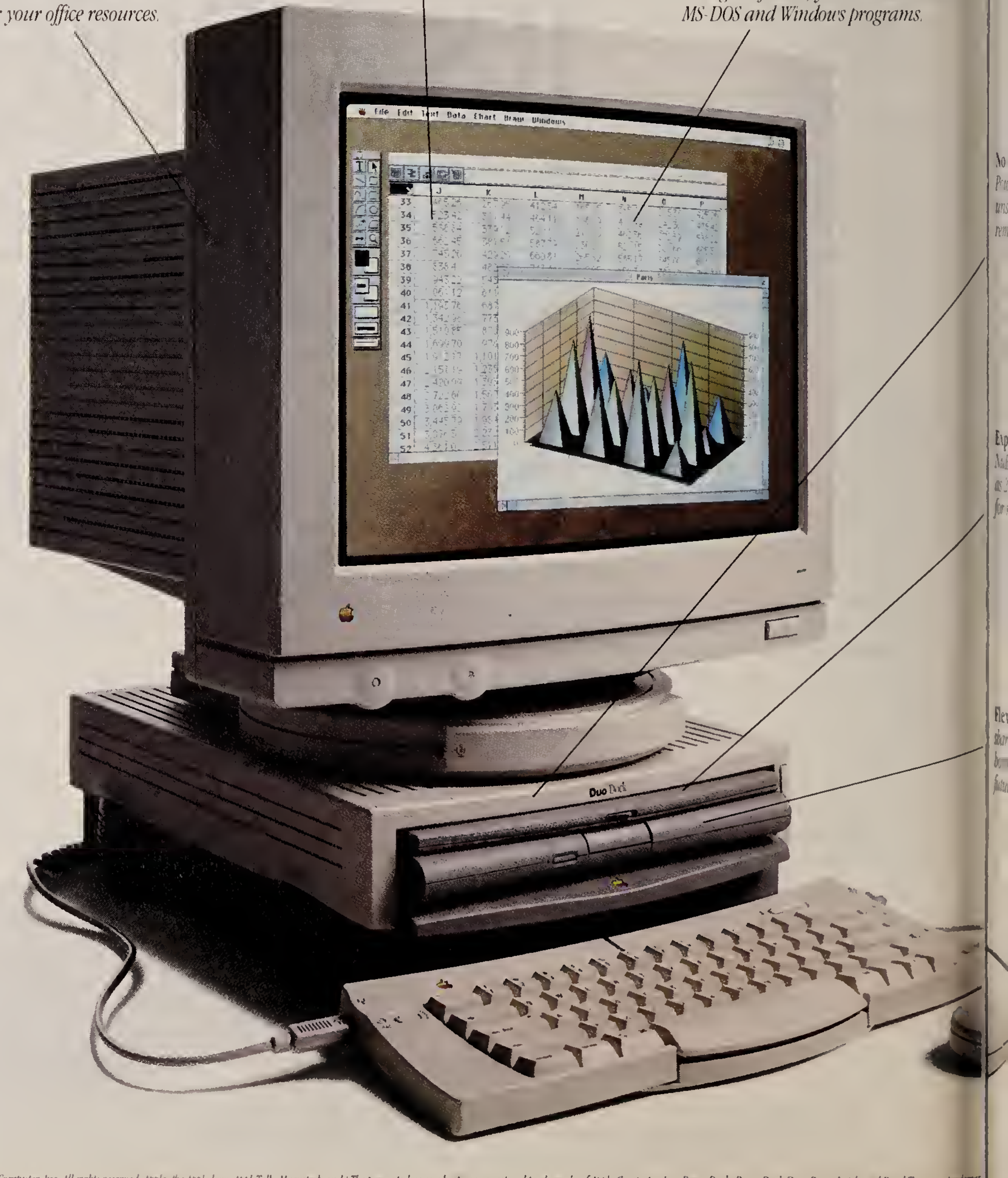

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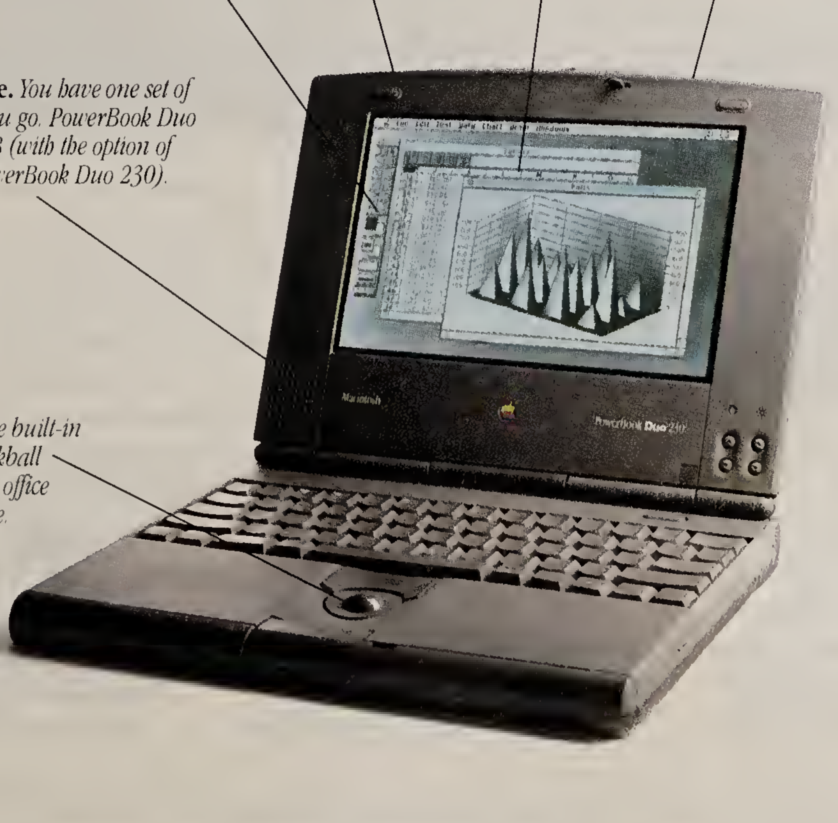

color display and any peripheral devices that may be attached.

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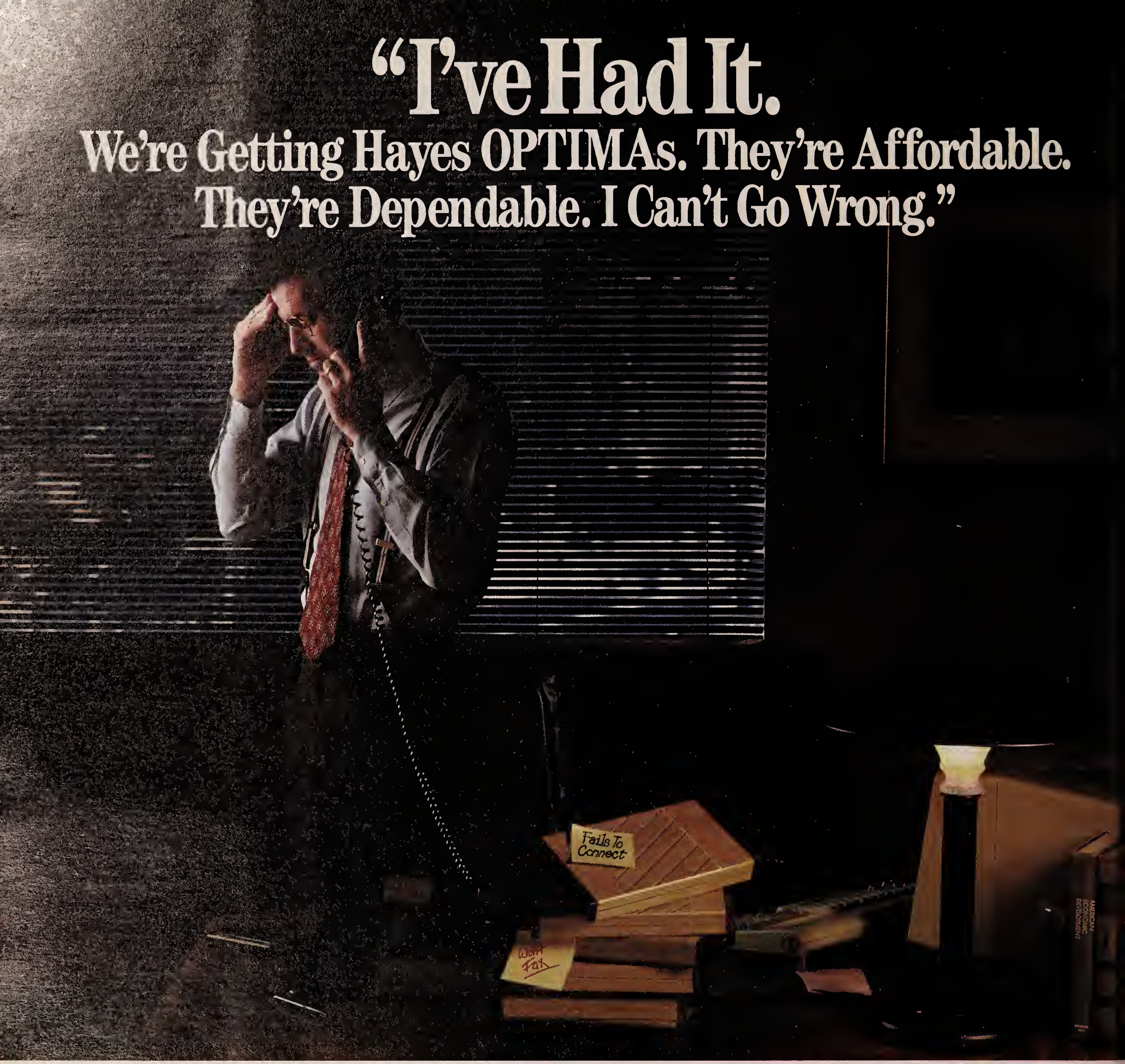
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Desktop Computing

Electricity a big data loss culprit, 65
New products, 67

Board Watch

Christopher Lindquist

Bugs: A fact of life

If you've followed this column through its short history, you've found more than a few references to bug reports from the various electronic services out there. Bug reports are a mainstay of computer journalism. It's an instant story: "User data damaged by bugs," or "Security flaw used by hacker to steal millions."

But let's get something clear: Bugs are not news in this industry. We've all seen them, and we know we'll see more. Software vendors today are trying to solve 100 equations in 100 variables to keep their products running on the myriad pieces of hardware we all have bought in order to save some money. Now we're paying the price for it.

These vendors don't like using their resources to fix bugs. They'd much rather spend the money and time on research and development, sales expansion and "RTFM" T-shirts.

So why don't we all cut them some slack and be a little more forgiving, OK?

What? Microsoft cleared *how much* this quarter? Ahem. Forget what I said about slack. If these companies are making that kind of money, their software should run on my toaster oven.

On to the bugs.

- MS-DOS, Windows 3.1 and NT, OS/2 2.0 and the 2.1 beta-test version, Unix (all flavors), Cairo, Pink, Taligent, Pick and good ole CP/M are buggy, slow, too big, unnecessarily proprietary, outdated, misguided, impossible to use and conducive to brain tumors, according to some bulletin board users.

That point having been made, beta-test users of both OS/2 2.1 and Windows NT 3.1 (What's in a name? A Version 1.0 by any other name is still a first release) are still reporting problems with installation and driver support, though things apparently are improving as the latest updates work their way out to the masses.

- Windows NT's MS-DOS and Windows' emulation quality are also on the upswing, users report, no doubt boosted by the efforts of Insignia (makers of emulation software for dozens of hardware and operating system platforms) on Microsoft's behalf. Even with Insignia's help, don't expect applications that directly manipulate hardware to work under Windows NT: The unreleased operating system's C2 security won't allow such hanky-panky.

- MS-DOS 6.0 is taking some lumps these days,

Lindquist, *page 65*

Turning to one-stop support

Benefits include better service, lower price tag

By Kim S. Nash

PC software companies such as Borland International, Inc. and WordPerfect Corp. have recently rid themselves of at least some end-user support costs by outsourcing the task to third-party support firms. But end users are also working deals with support providers such as Software Support, Inc. in Lake Mary, Fla., and Corporate Software, Inc. in Canton, Mass.

Among the benefits users reported were a streamlined payment process from buying all support from a single vendor and faster, more adept service than they would otherwise receive free from software vendors.

For example, Chemical Banking Corp. in New York escapes the accounting red tape of paying several software makers for support. The bank's Geoserv unit farmed out support for 1,300 PC users to Corporate Software in January 1992. Geoserv also buys applications from Corporate Software.

Geoserv now receives top-notch service that it could not always get internally, according to Anni Levy, manager of vendor relations and contract negotiations.

"Those technicians know what they're doing. There's no panic when someone calls with a technical networking question," she said.

The deal has gone so well, Levy explained, that she is considering buying support for other Chemical divisions, which would double the number of users calling outside the bank for PC help.

Software Support gives support to 125 PC applications and 50,000 to 60,000 end users through deals with at least seven vendors, including Borland, Delrina Technology, Inc., Corel Corp., Dell Computer Corp. and end users such as General Electric Co., MCI International, Inc., Coca-Cola Co. and Rockwell International Corp.

Corporate Software, meanwhile, offers multiple support options directly to end users and through software makers and retailers such as Computerland Corp. and Egghead Discount Software. The company also sells many of the packages it supports.

Outsourcing support can save end users money on internal help desks on a per-call basis and also on training help desk workers in new technologies, according to Steve Murtagh, director of consulting services at the Help Desk Institute in Colorado Springs.

Pfizer, Inc., a $7 billion pharmaceuticals firm, bought Corporate Software's HelpLine Custom program for its U.S. Pharmaceuticals Division more than a year ago in part to speed up the time end users spent getting questions answered. The program is aimed at custom-

Support, *page 66*

Software Support Chief Executive Joseph Jacoboni entices software makers to outsource support by appealing to their bottom lines. Vendors can help make up profits lost through a software price war, he said, by "transitioning end users from free support to a for-fee plan."

Microsoft may have card to play in PDA market

By Michael Fitzgerald

Microsoft Corp. has so far ignored the nascent personal digital assistants (PDA) market, but numerous industry sources said the firm is gearing up to go after what could be the hottest growth market of the late 1990s.

Microsoft, together with Intel Corp., is rumored to be nearing an announcement for a software/hardware reference kit for the PDA market, which some think could see millions of units sold.

Microsoft's portion of the effort, a non-DOS operating system called WinPad, "could be very important to Microsoft and the entire PDA market," said Tim Bajarin, president of Creative Strategies Research International, Inc. in Santa Clara, Calif.

Bajarin said Microsoft's presence could draw developers of software that currently runs on Intel chips away from developing for Apple Computer, Inc.'s Newton operating system. Other contenders in the PDA operating system market include Go Corp.'s PenPoint and GeoWorks, Inc.'s GEOS. General Magic, Inc.'s Magic Cap may also become a factor in the market down the road.

WinPad is expected to be used with a 3.3V I486 chip set being jointly developed by Intel and VLSI Technology, Inc., according to sources. Intel needs to parry bids by AT&T and others to grab the processor market for PDAs, analysts said. Sources said WinPad will be based on a non-DOS core with a Windows application programming interface (API) so that developers can write software for it more easily.

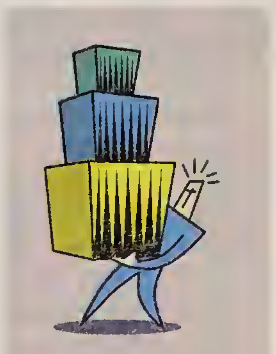
WinPad will accept pen input and address some of the technical problems with Windows for Pen Computing, such as its tendency to stop accepting pen input when a task is operating in the background. At the same time, it gives Microsoft an entree into a market that could become important.

Key market

"PDAs are not important now, but toward the end of the decade they'll be as common as calculators, and if Microsoft loses control of that market, their business strategy begins to falter," said Jesse Berst, editor of the "Windows Watcher" newsletter in Redmond, Wash.

At the same time, analysts agreed that while Microsoft has little visibility in the PDA market, no one else, including Apple, has had anything to show but hype.

Given that the market for PDAs may not develop until the end of the decade, "does the fact that [other companies] have a head start make Microsoft late? The jury's still out on that," said Mark Cummings, pocket intelligence program manager at SRI International, Inc. in Menlo Park, Calif.



One's enough

Will users carry more than one computer? Some have doubts. David R. Korus, an analyst at Kidder Peabody & Co., said, "What no one's written about the PDA market is that people are not going to carry two things. So when a full-function notebook starts weighing 3½ pounds, that's all you're going to carry. Not getting this market is not going to hurt Microsoft."

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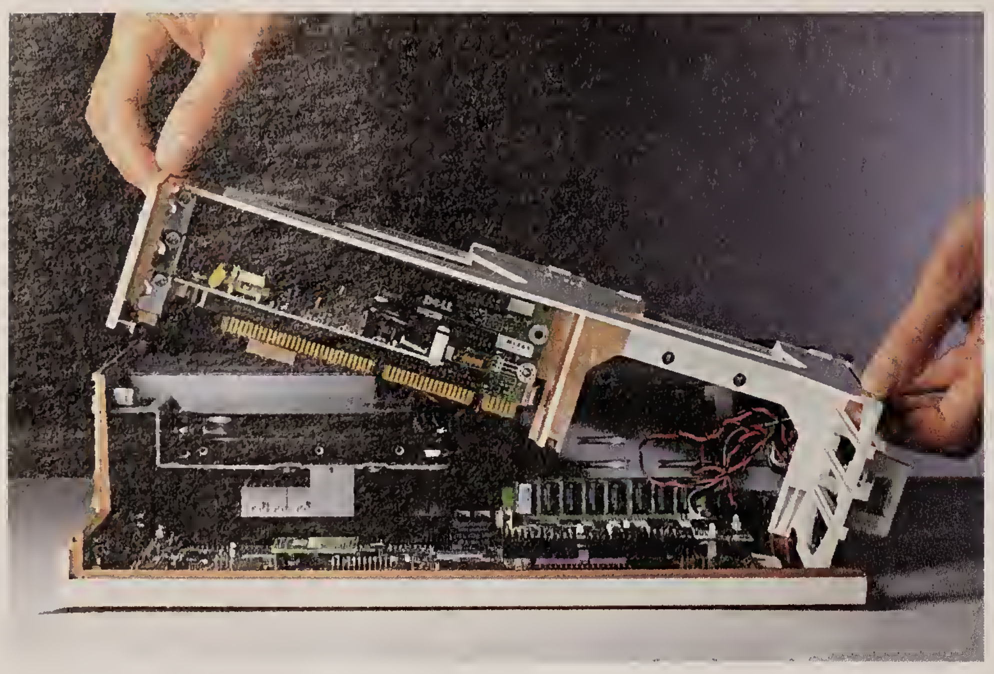

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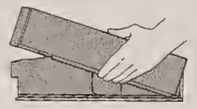

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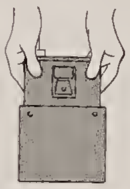
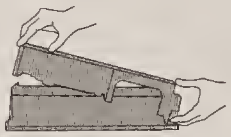


Just push two buttons (you won't need an M.I.T. degree for this either), unplug two cables, and slide out your diskette drives for easy upgradeability or service. Or to add a tape drive or CD-ROM drive.



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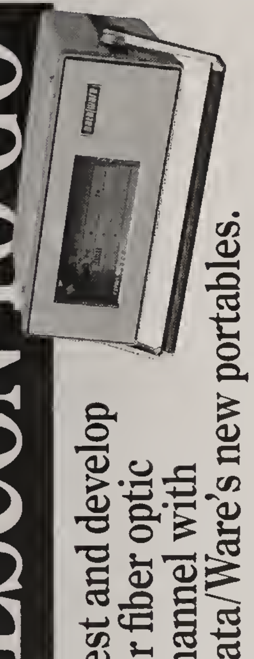

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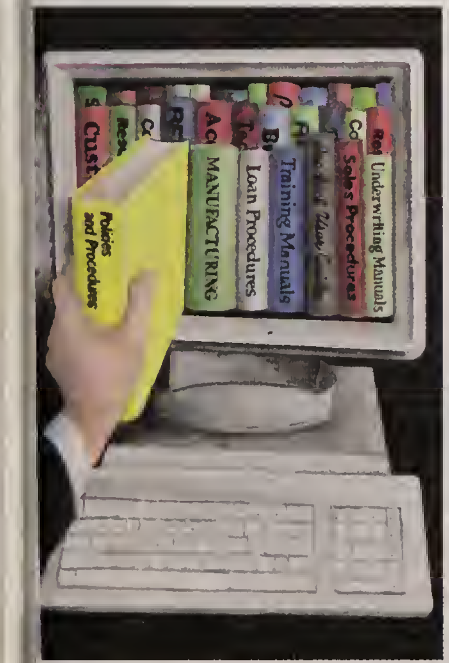

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Desktop printers

Color ink jets aim for top spot

By Stephen P. Klett Jr.

Advances in the quality of color ink-jet output tied with rapidly falling prices may signal a premature end to the heyday of serial dot-matrix printers.

According to a five-year forecast by market research firm BIS Strategic Decisions in Norwell, Mass., U.S. sales of dot-matrix printers reached their peak at just under 5.5 million units last year, compared with 5.1 million in 1991. Sales are expected to drop to fewer than 5.2 million units this year and decline by nearly 80% by 1997.

Meanwhile, color ink-jet printer sales quadrupled in 1992, from 90,000 units shipped to 360,000, and are expected to continue this explosive growth trend.

Monochrome ink-jet sales will overtake dot-matrix printer sales by 1995, with color and color-capable ink-jet sales bringing up the rear but overtaking monochrome ink-jet sales by 1997, according to Bill Flynn, senior market analyst for BIS' color hard copy service.

"Everyone knew there would be a change in the market someday [from dot-matrix to ink-jet technology], but a lot of people didn't think it would happen so soon," he said.

In 1997, 3.75 million color/color-capable ink-jet units are projected to ship at a list value of $1.04 billion, for an average price of just under $300 each, Flynn said. He added that low-end dot-matrix printers currently sell for an average list price of $250.

The big switch

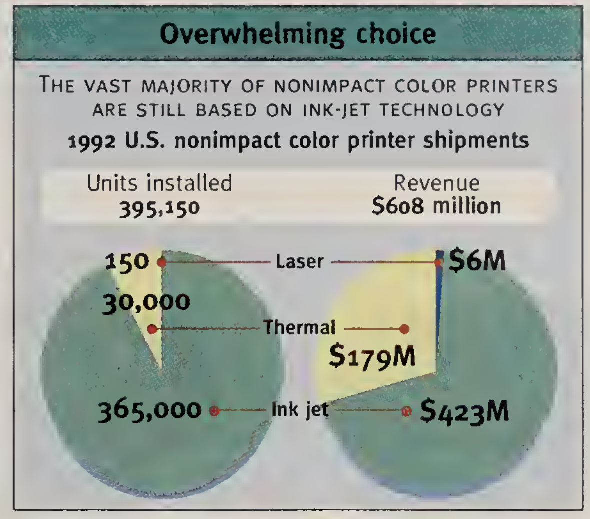
Users are already beginning to take advantage of the new prices and quality improvements.

Randy Shaw, senior end-user services analyst at the Federal Reserve Bank of Baltimore, said his department has two Hewlett-Packard Co. DeskJet 550Cs and recently purchased an XL300 color laser printer. Shaw has seen an increase in the number of staff members using the color printers. "They are really going to be popular," he said. "Users want to print the colors they see on their screens . . . and [color printers] are starting to come down in price enough and their quality is good enough to do what you want them to."

Overwhelming choice

THE VAST MAJORITY OF NONIMPACT COLOR PRINTERS ARE STILL BASED ON INK-JET TECHNOLOGY

1992 U.S. nonimpact color printer shipments



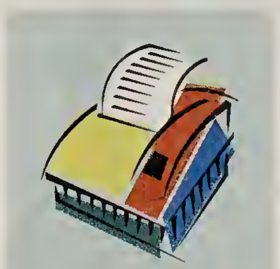
Source: BIS Strategic Decisions

Shaw said that initially some users expressed reservations about using color ink jets. "They were worried about problems with smearing, but once you've seen the output you see it's not a problem," he said.

Ben Berry, manager of computer services at Hughes Aircraft Co. in Long Beach, Calif., said he has noticed an increase in the company's use of color printers, which are used mainly for outputting high-quality presentation graphics.

"We're not buying dot-matrix printers anymore; the output is not professional enough," Berry said. He added that Hughes primarily uses color laser printers and is not buying ink-jet technology right now. However, Berry said that when an ink jet comes out with a full range of color capabilities at a good price, "that's something we would jump on."

According to Flynn, HP is enjoying considerable success with its single-cartridge DeskJet 500C and appears to be one step ahead of the rest of the market. HP cut the price of the 500C from $779 to $619 in March, and Flynn said he has seen them sell for as low as $500. HP also cut the price of its new dual-cartridge DeskJet 550C, which debuted in October, from $1,099 to $879. He said more cuts are in the offing.



Color boom

There will be more color ink-jet printers sold in 1995 than serial dot-matrix printers, monochrome ink-jet printers and 0-6 page/min. plain paper printers, according to BIS Strategic Decisions. Color ink-jet printer sales are expected to reach 2.4 million units in 1995.

Lindquist

CONTINUED FROM PAGE 63

too. Seems some users are not exactly pleased at the fact that once you compress a disk with Double-Space, the only way to get rid of it is to reformat. Third-party products, such as Stac Electronics, Inc.'s Stacker, allow you to deinstall should you run into problems.

MemMaker, the automatic memory optimization utility in MS-DOS 6.0, is also catching some flack. Seems some users are not getting anywhere near the free memory they used to get with products such as Quarterdeck's QEMM under MS-DOS 5.0. The response from some happy MS-DOS 6.0 customers is, "You should feel lucky you get it at all for less than $50."

• For you X Window System users, there's a rather nasty security leak that allows unauthorized users to manipulate resources they shouldn't be able to touch. An Internet user posted a C program to alt.hackers that allows users to close windows, kill processes and so on, without proper authorization. If you want details, send an E-mail and I'll gladly pass along the information about the posting, just so you can see what you're missing.

• Do you have PC Tools for Windows? Do you like it? Do you want to add a couple more buttons that aren't listed in the documentation? A user posted a patch to a PC Tools .INI file that puts an "indicate expandable branch" and "toggle file viewer window on and off" button on the PC Tools for Windows file manager. If you like hex searches, send me a message. No warranty is either expressed or implied.

• Finally, if you're a fan of British Parliamentary debate, rugby or other contact sports, check out alt.fan.bill-gates on Usenet. There's enough vitriol being spilled there to make a libel lawyer salivate. No word from Bill himself, but a couple forged messages have caused some fuss.

One false "billg" even said that Nostradamus had predicted that Unix System IV Release V would be the last version ever to see the light of day, but that's not really true. He said Next would become a software company.

☞ *So what do you think? This column has been offered for your perusal for a while now, and the response has been good, but how can I make it better? Criticism, comments, congratulations or just plain character assassination can be sent via the Internet to chrisl@netcom.com; CompuServe at L72360,2005; or MCI through 549-8464.*

Lindquist is a *Computerworld* West Coast correspondent.

Lightning can strike twice

By James Daly

Pernicious hackers and destructive viruses are not the only threats to the safety of your computer system. Information systems security managers need to worry about the electricity demon as well.

In a recent ranking of the sources of loss on PC systems, electrical power surges ranked second only to theft, the perennial front-runner, and accounted for a whopping $174.2 million in damages last year. Power surges represented 12% of all losses, while havoc specifically due to lightning accounted for 3%, or $47 million, in damage.

Altogether, PC losses exceeded $1.3 billion during 1992, according to Safeware, The Insurance Agency, Inc., a Columbus, Ohio-based insurer that conducted the study. The damage figures represent hardware lost and not the cost of repairing or replacing lost data.

Safeware Chief Executive Officer David Johnston said computer electrical problems have gotten worse because users leave their machines running constantly, a habit that Johnston thinks people should avoid. "I just don't think people realize how fast lightning can fry your data," he said. Johnston added that the increased use of modems has provided another path for surges.

An average business environment will see as many as 100 surges and spikes of more than 1,000V a year, according to the Institute of Electrical and Electronics Engineers, Inc.

A surge is a short-term overvoltage lasting several milliseconds and usually local in origin, especially when heavy current-draining electrical motors are turned on and off repeatedly. They can also occur regionally when a utility company is making adjustments through an area power grid.

Overvoltage makes equipment run hot and, if not corrected, can cause equipment failure and totally disrupt a data center. Problems can range from data loss to permanent hardware damage.

Johnston said a good preventive measure is the installation of a surge suppressor, an electrical device placed between your PC equipment and the main electrical supply. It contains special circuitry that clamps down voltage when it starts to rise beyond an acceptable level, preventing dangerously high voltage from reaching sensitive PC equipment.

All surge suppressors should have a circuit breaker, a resettable switch that turns the supply off if the circuits become overloaded. Many surge suppressors also provide multiple sockets, wherein each socket is protected separately. Experts said the better protectors have a UL 1449 rating of 330V.

Try to get a protector with fusing for fire protection and a load capacity of 15 amps; less than 15 amps can be inadequate for a computer system.

Johnston noted that even if electrical bursts do not knock out your equipment right away, they can still cause damage.

Turning to one-stop support

CONTINUED FROM PAGE 63

ers who generate more than 100 calls per month and require on-site personnel assistance.

Three Corporate Software technicians work on-site at Pfizer, freeing up 35 to 40 information systems staff members who previously supported end users and largely replacing vendor-supplied hot line support, according to John Morgan, manager of pharmaceutical systems at the company.

"Waiting on technical support lines was not the most productive use of our time," Morgan explained, adding that Pfizer was not able to build the same expertise that Corporate Software offers. "Buying support is not the cheapest [option], but the benefits we've been able to draw are worth it," he said.

Not for everyone

However, because Software Support and Corporate Software offer only limited, if any, mainframe software support, some users have decided against third-party options.

Southern California Gas Co., for example, has no plans to buy outside support for its 5,000 PC users, according to Bob Holmes, computer technology research analyst.

An in-house, seven-member help desk supports the Los Angeles-based utility well because it can trouble-shoot and fix more than just PC software, according to Holmes.

"We need that kind of wide-ranging service," Holmes said.

Support switch

Borland recently handed over support duties for 12 applications to Software Support, including support for several former Ashton-Tate Corp. packages.

Users received free support until May 1 and then had to cut deals with Software Support, according to a Borland spokesman. Customers were notified of the change by a message posted on CompuServe and a recording on the current support hot line. Also, MultiMate users received a letter explaining the new support options, the spokesman said.

Borland said it was forced to outsource end-user support for these applications because the high cost of maintaining a support staff trained in obsolete applications now outweighs sales of those old packages.

Other factors motivating some PC makers' moves to paid support include the following:

- High research and development outlays by software makers to build today's increasingly complex PC applications.
- Squeezed profit margins on current packages swept up in a software price war.
- Users downsizing to PC networks are seeking help with quite complex issues that vendor-provided support technicians cannot always address.
- Hot line overload during busy periods such as upgrade times.

— *Kim S. Nash*

Borland applications now supported by Software Support

- MultiMate
- Sidekick
- Reflex Mac, Reflex PC
- Screenery for Windows
- Applause II
- Framework Runtime Plus
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- FullPaint, FullWrite Professional
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New Products

Systems

ZyLab, a division of Information Dimensions, Inc., has introduced ZyIndex 4.0 for DOS, a document retrieval system.

The product allows users to extract precise information from word processing, database or spreadsheet files on a hard disk and network system, the company reported. All files are kept in their native file format. Version 4.0 provides new search capabilities, unlimited index and file sizes and greater ease of use.

Other features include pull-down menus, new printing options, streamlined index building and maintenance procedures, auto sense word processing file formats, search requests of up to 300 characters and mouse support.

The product costs $395 for single users and $995 per network pack with three concurrent user licenses.

▶ *ZyLab*
100 Lexington Drive
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SMJ Electronics has introduced the Cache Port, an expansion card.

The product was designed to replace the standard PC parallel port, streamlining high-volume printing operations. It has the ability to minimize the CPU time needed for printing tasks and does not require additional configuration or software to operate in industry-standard PCs, the company reported.

The card fits into an 8- or 16-bit slot of any XT/AT-compatible computer and comes standard with 1M byte of random-access memory. A standard single in-line memory module with room for a single 1M-, 4M- or 16M-byte module is also included.

The Cache Port costs $449.

▶ *SMJ Electronics*
B-200, 3500 Clayton Road
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(510) 672-3885

VIS Development Corp. has released Avenue, a system that enables corporations to convert videotapes into personal computer-based interactive multimedia applications, according to the company. A user database is built with collected information.

The product uses Intel Corp.'s DVI compression standard and ActionMedia II board. The firm said Avenue delivers playback in full- or quarter-screen windows at a speed of 30 frames per second.

Avenue runs under Microsoft Corp.'s Windows 3.1 on an 80386 or I486 processor with 8M bytes of random-access memory. It requires a 256-color, 640 by 480 Video Graphics Array display.

Complete Avenue applications start at $10,000.

▶ *VIS Development*
100 Fifth Ave.
Waltham, Mass. 02154
(617) 466-6678

Macintosh products

Epson America, Inc. has introduced Epson Talk, a connectivity kit for Epson LQ dot-matrix printers.

Epson Talk allows Apple Computer, Inc. Macintosh users to access printers in the Epson LQ 70 series and certain ActionPrinter products.

According to the company, Epson Talk was designed for users who require specialized forms-printing solutions that are not fulfilled by other printers or printing technologies. A LocalTalk interface and chooser level driver are included. Epson Talk works with every Macintosh software package.

The product costs $229.

▶ *Epson America*
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Windows NT platform choices plentiful

By Michael Vizard and Michael Fitzgerald

With the delivery date for Microsoft Corp.'s Windows NT operating system looming, information systems directors are pondering their options for systems to run NT on.

Unlike previous Microsoft operating systems, Windows NT, due to appear late this month at Windows World in Atlanta, was designed to run on several hardware platforms. Windows NT supports Intel Corp.'s Pentium, Digital Equipment Corp.'s Alpha AXP, the R4400 from Mips Technologies, Inc. and the Clipper system from Intergraph Corp. As a result, providers of reduced instruction set computing (RISC) systems have come to view NT as an entree into the mainstream world of commercial Windows applications.

But whether these vendors will be able to leverage the performance of their RISC systems against formidable Intel is very much in doubt, according to analysts such as Andrew Allison, an independent consultant in Carmel, Calif.

"NT is the RISC guys' big opportunity and their last hope," said G. Glenn Henry, senior vice president at Dell Computer Corp. in Austin, Texas. Henry said Dell is paying close attention to the RISC market because "for customers, NT [will] really enable them to think about moving things off one platform to another."

But that benefit will not come without some cost. Henry said no application is portable without some hand-coding, so testing and bug-fixing become the major costs of application ports.

"Realistically, a 20% to 30% performance difference [between RISC and Pentium], which is what you're seeing out there, won't be enough to drive software people and customers to do a lot of new work," Henry said.

According to Allison, the performance and volume pricing of Pentium processors, which will not be widely available in systems until early 1994, will put pressure on both DEC and Mips to deliver higher performance processors for NT in the near future. For example, DEC currently touts a 130-MHz system for Windows NT developers but is capable of delivering a 200-MHz system. Pentium's highest planned speed is 100 MHz.

Performance enhancer

While Windows NT provides a standard front-end compiler for applications, called the C7 compiler, each hardware vendor provides its own back-end compiler. The sophistication of these compilers, which handle memory management and I/O subsystem calls, can dramatically affect performance.

The speed differences have offered software vendors a plethora of options regarding NT. Dave Morehead, director of research at IMRS, Inc. in Stamford, Conn., reported that 10M to 12M bytes of floating-point data runs about twice as fast on an R4000 or Alpha platform as it does on a 50-MHz I486, though Intel countered that Pentium's performance is substantially faster than that of an I486.

Making the grade

Pentium's initial 66-MHz speed makes it a close rival of a 130-MHz Alpha AXP system in terms of SPEC integer performance, which reflects office automation applications.

The Pentium processor also fares well in industry-standard benchmarking tests such as SPEC floating-point performance, which reflects graphics and other numeric-intensive applications, compared with a 50-MHz R4000 Mips processor. However, a 130-MHz Alpha AXP system is almost twice as fast in terms of floating-point performance.

"We haven't optimized our NT code for Alpha, but it's our sense that NT runs a lot faster on Alpha," added Tom Daly, manager of trading systems at the Midwest Stock Exchange in Chicago.

Still, analysts said Intel's early focus on working with compiler vendors has given it a significant advantage with software vendors.

"Intel set out a road map that included hiring experienced compiler developers to work directly with software vendors, while DEC, for instance, depends largely on Microsoft to handle that," said Janet Ramkissoon, an analyst at Quadra Capital, Inc., a research and money management firm in New York.

Mixed bag

Intel's Pentium finishes a close second when tested against RISC chips on integer performance, but it falls to the middle of the pack in floating-point tests

SPEC92 performance

	SPECint92*	SPECfp92**
Alpha 21064/133	65	112
Pentium 66 MHz	64.5	56.9
MIPS R4000/50	58	60
SuperSPARC/40	53	63
PA750/66	51	75
RS/6000/350	35	65
PA710/50	33	48
Intel I486 Dx2-66	32	16
RS/6000/340	28	52
MicroSPARC	26	21

*Higher integer performance vs. alternatives
**Workstation-class floating-point performance

Source: SPEC Newsletters CW Chart: Michael Siggins

"And there are some disadvantages, in theory, to jumping to a different processor — for example, the lack of native executable code compatibility," said James Hansel, vice president of investment systems at UBS Asset Management, Inc.

"I understand they have emulators [for my existing DOS and Windows applications], but I have always been extremely skeptical of emulator claims."

Pending Pentium chip debut spurs plans for system buys

By Kim S. Nash

The chip is not even out yet, but early signs indicate that Intel Corp.'s Pentium processor may bring a few large sales and a lot of small deals when it ships in volume midmonth, according to a recent survey by the *Computerworld* Database Division.

More than 500 information systems executives polled during February and March said they plan to spend more than $31 million, collectively, on Pentium-based workstations and servers this year. In addition, 39 of the 508 companies surveyed plan single buys of more than $100,000 each.

One estimate pegged Pentium shipments at 10,000 chips in the second calendar quarter, ramping up to 450,000 processors by year's end, according to Brad Day, analyst at Dataquest, Inc. in Framingham, Mass. "And nearly every one of those will be sold," Day predicted.

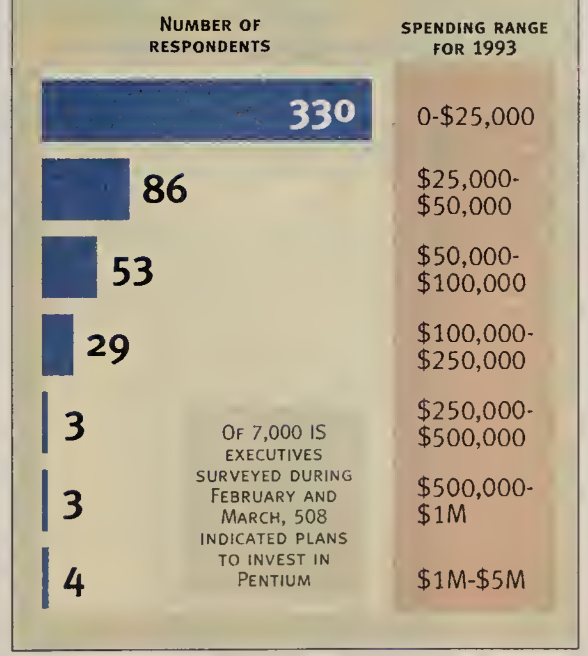
Dell Computer Corp. and Gateway 2000 Ltd. are in line to catch a fair share of that business, according to respondents who have chosen a vendor. However, 242 people said they were undecided on a source for their new boxes.

Systems are expected to start at $5,000 to $7,000 each for low-end server and desktop machines, according to several firms that have laid out plans to ship Pentium-based systems in parallel with Intel's formal unveiling of the chip May 17. Product plans include the following:

- **Compaq Computer Corp.** will put Pentium on three lines of boxes: SystemPro/XL multiprocessor servers, ProSignia single-processor PC servers and DeskPro/M single-user PCs. All will use Compaq's TriFlex server technology, which was designed to exploit Pentium's promised processing power [CW, March 22].
- **NCR Corp.** plans to announce a series of underdesk PCs, upgrade boards and scalable superservers running Pentium, a spokeswoman said.
- Superserver makers **Tricord Systems, Inc.** and **NetFrame Systems, Inc.** have promised systems. For example, NetFrame's models in its CS line of servers, which are targeted at minicomputer users downsizing to client/server architectures, can run Intel's latest and greatest, the company said.
- **IBM** demonstrated a Personal System/2 Server 295 running Pentium recently at CeBit in Hannover, Germany.
- On the OEM side, **Corollary, Inc.** plans to ship C-bus II Pentium boards and basic systems to Siemens/Nixdorf Information Systems, Inc. and is looking to sign similar deals with other hardware makers, said George White, Corollary president.

Starting small

Interest in Intel's Pentium chip is focused on small investments, although a few users plan big buys



Source: *Computerworld* Database Division

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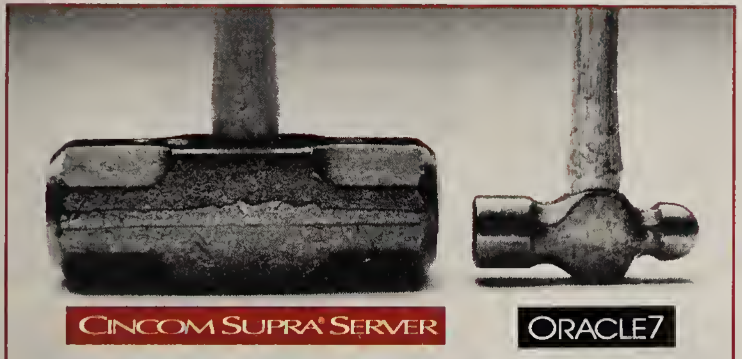

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Three Schema Architecture	Yes	No
Cursor Management *(auto cursor, cursor stability, fully scrollable cursor)*	Yes	No
Inherent Support of Multimedia Objects in a Distributed Transaction *(audio, full motion video, images, etc.)*	Yes	?
Robust Life Cycle Development Tool Set *(production quality applications for powerful, centralized computers and workstations alike)**	Yes	Yes

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Vendors try to bridge backup tape gap

By Michael Fitzgerald

Spring seems to have inspired tape backup makers to flood the market with new products, many of which are aimed at closing the gap between mainframe backup and current client/server-oriented products.

Several of those announcements were made recently, and Michael Peterson, president of Peripheral Strategies, Inc. in Santa Barbara, Calif., predicted that "all the players will release new products in the next 90 days."

Still, users said these products would fall short of the features they will need to begin to match the performance they get from their mainframe systems.

"Everybody's come up with sophisticated schedules to do things overnight, but it takes a lot of time to retrieve information when you need it, and we need to be able to do that faster," said Allen L. Cournyer, senior vice president and manager of the data center division at Texas Commerce Bank NA in Houston. Cournyer said the bank was looking at hooking up its IBM 3480 and 3490 host-style tape devices to its local-area networks to address this need.

What's new

Announcements included the following:

- **Conner Peripherals, Inc.**'s new storage division, Conner Storage Systems Group (formerly Maynard Electronics) in Lake Mary, Fla., announced a partnership with **Legato Systems, Inc.** to produce a high-capacity network data backup and management tool aimed at the client/server market. The Conner Networker is already shipping, and prices range from $750 to $7,500. Conner also released three autoloaders for the digital linear tape, digital audio tape and 8mm markets capable of 48G- to 50G-byte capacity. In a separate announcement, Palo Alto, Calif.-based Legato said it will support Sun Microsystems, Inc.'s Solaris 2.1.
- **Palindrome Corp.** in Naperville, Ill., will move toward the low end of the market by offering Backup Director 2.1, essentially its high-end Network Archivist software without the archiving and migration feature. The product, now shipping, has an introductory price of $795.
- **Cheyenne Software, Inc.** announced ARCserve 5.0 for Novell, Inc. NetWare, which features a Microsoft Corp. Windows interface and allows for simultaneous processing for up to seven tape drives. The Roslyn Heights, N.Y., company will ship its product on June 30.

In Brief

Object and Cadence agree

Object Design, Inc. and **Cadence Design Systems, Inc.** have agreed that Cadence will use Object Design's ObjectStore database in its next-generation electronic design automation (EDA) software tool suites, due out next year.

ObjectStore will also be incorporated as the storage manager for Cadence's Design Framework II, a move company officials said signals the EDA industry's shift away from proprietary databases to standard commercial databases.

Tool kit provided

SunSoft, Inc., the software subsidiary of **Sun Microsystems, Inc.**, recently announced that it will provide **IXI Corp.**'s OSF/Motif tool kit to SunSoft's third-party software developers. Under the terms of the agreement, SunSoft will make IXI's Motif developer's kit immediately available on Sun's Scalable Processor Architecture (SPARC) platform and will provide the kit on Intel Corp. platforms later this year.

SunSoft also said it will incorporate IXI's OSF/Motif technology as part of the graphical user interface in the next release of Solaris for SPARC and Intel platforms.

ProWorks for Solaris

SunPro, the software development business of Sun Microsystems, Inc., is planning shipments this month of its ProWorks tools for the Solaris Unix operating system on Intel Corp. X86 platforms. The tools will be identical and fully source-code-compatible with SunPro tools on the SPARC platform, company officials said.

ProWorks includes development tools, code management tools and language systems for C, AT&T's C++ and Fortran. SunPro also slashed the price of its C development environment by nearly 40% to $995 for SPARCworks Professional C and ProWorks C.

Spreading FDDI

As part of a move to expand Fiber Distributed Data Interface (FDDI) networks to desktop PCs, **Network Peripherals, Inc.** said that **Anixter Bros., Inc.**, a Skokie, Ill., distributor, will resell its line of FDDI network cards and concentrators.

Token Ring prices lowered

For the second time this year, **Thomas-Conrad Corp.** in Austin, Texas, dropped prices on its Token Ring adapter cards. For example, a 16M/4M bit/sec. XT/AT bus Token Ring adapter, formerly listed at $599, now costs $495.

Separately, Thomas-Conrad said it signed a multimillion-dollar contract with systems integrator **Electronic Data Systems Corp.** EDS will resell Thomas-Conrad's Token Ring, Ethernet and Arcnet adapter cards.

Da Vinci for CompuServe

Local-area network electronic-mail company **Da Vinci Systems Corp.** in Raleigh, N.C., is providing technical support through the **CompuServe Information Service.**

Users of DaVinci Email can access the DaVinci Forum by typing "GO DAVINCI" from CompuServe. The company's support people will answer users' questions on-line for no charge above the typical CompuServe fees.

DaVinci is the third most popular LAN E-mail package — after Lotus Development Corp.'s CC:Mail and Microsoft Corp.'s Mail — with an estimated 1.2 million user installed base.

NASA contract

Network Computing Devices, Inc. (NCD) has been selected as the sole vendor to supply thousands of X Window System terminals to **NASA** under the Scientific and Engineering Workstation Procurement program. The contract, awarded by NASA's Goddard Space Flight Center in Greenbelt, Md., through contractor **Government Technology Services, Inc.**, could be worth as much as $4 million to NCD during the next five years.

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Notework E-mail system enhanced

By Lynda Radosevich

BROOKLINE, MASS.

Notework Corp. announced an updated version of its Novell, Inc. NetWare-based electronic-mail software, which has been shipping since March.

Reportedly lauded by technophobes for its simplicity, Notework Version 2.0 fills in a few feature holes and increases the capabilities of some administrative functions.

"The biggest difference for us is seeing the full name in the address list," said Mike Nippo, information center supervisor at the Physicians Insurance Co. of Ohio in Pickerington. Before, addresses included first initial and last name. Now, users can search for cohorts by first name as well, he said.

On the server side, Notework distinguishes itself from the biggest local-area network E-mail packages, including Lotus Development Corp.'s CC:Mail and Microsoft Corp.'s Mail, because it does not require a dedicated router or message transfer agent — an "extra level of complexity that you don't need," said David Ferris, editor of the "Ferris E-Mail Analyzer."

Unlike most large E-mail installations, Notework does not require a dedicated server to check messages for forwarding.

Usually, large E-mail installations require a dedicated server to check message storage to see if messages need to be forwarded. That intelligence, Ferris said, is in Notework's client software. According to Notework, the package can use NetWare's Message Handling Service to support up to 100 file servers without requiring a dedicated mail server.

Notework, which costs $30 to $45 per user, is a 5K-byte program that stays in a computer's upper memory. It can be accessed in DOS applications using a keystroke combination or in Windows applications by clicking on an icon.

Physicians Insurance first chose Notework in 1991 after a committee comprising "80% computer-illiterate users and 20% expert users" overwhelmingly picked Notework over Lotus' Notes and CC:Mail, WordPerfect Corp.'s Office and Da Vinci Systems Corp.'s Email.

"It does not have the more advanced capabilities [such as spell-checking], but our objective was to find something that was easy to use and that users liked," Nippo said.

Other new features include a 50,000-name address book that automatically logs senders' addresses. When searching for a name such as Michael, a user can type an "M" and all the names beginning with "M" pop up. As more letters are typed, the address book pinpoints the correct address. Addresses across file servers all appear on the same address list.

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New Products

Workgroup software applications

Hiarc, Inc. has introduced Sparcus, a software product that enables Unix workstation users to transparently manage files based on their on-line, near-line and off-line data access requirements. File servers can be created with practically unlimited storage capacity by using a Sun Microsystems, Inc. SPARCstation and an optical jukebox as overflow storage for workstation-based magnetic disk drives, the company reported.

All files, including those that are stored near-line on optical cartridges, appear to be on-line.

Sparcus costs from $16,500 to $95,000.

▶ *Hiarc*
Suite 250
3 Corporate Park
Irvine, Calif. 92714
(714) 253-6990

Unix

Software AG of North America, Inc. has announced Natural Construct and Predict for Unix.

The production-scale application engineering tools for Unix platforms enable users to maintain central or departmental control while distributing application development anywhere from the desktop to the mainframe.

Natural Construct is a model-based application generator that offers ease in prototyping applications and rapid application development. The technical design, implementation and maintenance of applications and databases are supported and documented by Predict, an integrated, active data dictionary.

Prices for each product range from $600 to $34,900.

▶ *Software AG of North America*
11190 Sunrise Valley Drive
Reston, Va. 22091
(703) 860-5050

4th Dimension Software, Inc. has announced the release of the Enterprise ControlStation. According to the company, the product runs as a Unix application on Sun Microsystems, Inc.'s SPARCstations and IBM's RISC System/6000s.

The Enterprise ControlStation also communicates with the company's Control-M Automated Job Scheduling and Production Control system when it is on the mainframe by using Transmission Control Protocol/Internet Protocol or IBM LU6.2 protocols.

Prices range from $35,000 to $90,000.

▶ *4th Dimension Software*
1 Park Plaza, 11th Floor
Irvine, Calif. 92714
(714) 757-4300

Saratoga Systems, Inc. has introduced SPS, an account management and sales information software package for The Santa Cruz Operation's SCO Unix.

According to the company, the product offers an integrated, companywide solution to sales automation. Users receive access to sales-related information and multilevel customer profiles and can perform updates. PC or laptop computer users have the ability to upload or download information from their company's central SPS database because the product typically functions as a distributed database, the company said.

SPS costs $1,250 per PC copy.

▶ *Saratoga Systems*
Suite 230
1550 S. Bascom Ave.
Campbell, Calif. 95008
(408) 371-9330

SPSS, Inc. has introduced SPSS 5.0 for Unix, a statistical software package.

The Open Software Foundation's Motif user interface has been provided for greater ease of use and learning. Integrated capabilities have been added for analysis, data access, graphics and reporting. Many features are included, such as hypertext Help and a glossary of statistical terms, clipboard support for moving text and data to other applications and object-oriented chart editing.

Prices start at $1,000.

▶ *SPSS*
444 N. Michigan Ave.
Chicago, Ill. 60611
(312) 329-2400

Workstations

CompuAdd Computer Corp. has announced the CompuAdd SS 10, a fourth-generation Scalable Processor Architecture (SPARC) workstation.

The product is 100% binary-compatible with Sun Microsystems, Inc.'s SPARCstation 10 and incorporates two M-bus and four S-bus slots. Sun-specific single in-line memory modules are supported, providing 512M bytes of memory.

The SS 10 replicates the Sun machine in all I/O capabilities.

A typical configuration consists of 32M bytes of random-access memory, a 525M-byte Small Computer Systems Interface hard drive, a 19-in. monochrome monitor and a 3½-in. floppy drive. It costs $15,495.

▶ *CompuAdd*
12303 Technology Blvd.
Austin, Texas 78727
(512) 250-1489

Storage

MountainGate Data Systems, Inc. has announced the IncreMeg 6000, a hard disk storage subsystem that consists of up to six 3½-in. IncreMeg removable drives.

Up to 7.2G bytes of formatted on-line capacity is provided for either a desktop or rack-mount configuration, and removable drive cartridges are offered for secure storage, exchange and transport of data, the company reported.

IncreMeg 6000 can be used for mission planning, video/audio editing and file servers. It supports most major platforms.

A fully-configured 7.2G-byte subsystem costs $19,500.

▶ *MountainGate Data Systems*
1110 W. Taft Ave.
Orange, Calif. 92613
(714) 998-6900

yes

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Bus-Tech also offers high speed controllers for channel attachment of existing SAA servers, and host based TCP/IP connectivity solutions.

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If you're considering buying Microsoft® Mail, you may wonder why you should pay. If you've been offered "free" mail, you should wonder when you're going to pay.

Electronic mail isn't a typical software purchase. It's a long-term strategic decision that will determine how well your people communicate with each other. In short, it will be a real factor in how well you do business in the 90s.

Naturally, there's a cost. Eventually.

Interestingly enough, a recent independent study[1] concluded that less than 10% of the cost of e-mail is the initial software investment. So before Microsoft convinces you that you're smart to make a strategic enterprise-wide decision based on 10% of the real stakes, consider what it will cost you once you've signed up.

Consider your "free" e-mail's back end. Then consider yours.

To accurately assess the other 90% of your e-mail investment, there are four key areas to consider.

First there are the back-end service costs: the design and administration tools required to run the system. The quality of these tools will impact hidden costs associated with disk storage and network bandwidth.

There are the infrastructure costs including minimum hardware configuration and platform changes.

There are connectivity costs associated with bridges and gateways to other systems.

And, of course, the people-related costs. Installation. Administration. And training.

Do the analysis yourself. Or just get some objective opinions.

The price you pay for the software you wouldn't buy.

The basic idea of the mail is that it gets delivered. But Microsoft Mail is not designed to deliver efficiently across competitive operating systems. To the contrary, if anyone in your organization works, or wants to work, on anything but a Microsoft operating system, there's a potential problem.

"But he doesn't have anything on!"

Microsoft doesn't have a UNIX® client. Its commitment to the OS/2® platform is historically questionable. And its connections to Mac® are inconsistent.

To make Microsoft Mail work across an integrated system requires gateways and links that inflate your real cost and degrade the speed and quality of the message delivery.

Of course, if you just promised never to leave Microsoft's world, this wouldn't be a problem.

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And cc:Mail was conceived for virtually effortless and limitless growth. Unlike Microsoft Mail, which has scalability limitations, Lotus® cc:Mail maintains peak performance from 5 to 500,000 users.

Industry reviews and customer surveys confirm that cc:Mail is not only easier to learn. It's also easier to use. And it's easier to administrate.

All of which explains why small companies and large corporations, including more of the Fortune 1000, have reached the same conclusion. When it comes to e-mail, the message is obvious:

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Analysis

At a distance

Tools for off-site network access are coming of age

By Joanie M. Wexler

Trends toward mobile computing and local-area networking are causing multiflavored remote networking offerings to catch users' attention.

Today's products fall into two main categories. "Remote control" software allows users to operate their office PCs from another location and see the activity, such as electronic-mail messages, on their remote screens. "LAN extension" products render a remote computer an actual node on the corporate LAN internetwork.

Each mode of remote access fits different application types. For example, "remote control is good for file-based applications, such as [Borland International, Inc.'s] Paradox database," said Janet L. Hyland, director of communications strategy research at Forrester Research, Inc. in Cambridge, Mass.

She said this is because Paradox "finds a user-requested entry and then sends the file to the local PC being controlled remotely for the crunching." This sidesteps the limitations of today's wide-area network bandwidth and the processing limitations of laptops.

Most copies of remote control software, which currently outsells LAN extension products but will likely fall behind next year (see chart), have been sold to allow support staff to "get into some user's PC and troubleshoot remotely," Hyland said.

Products vary not only in type of access but also in the variety of client platforms and LAN protocols they support and whether one server at the central site can support multiple users.

A good fit

In addition, products differ in licensing structures and how many protocols a user can juggle simultaneously, said Mike Neuburger, a network engineer at the University of Oregon in Eugene, a Centrum Communications, Inc. CentrumRemote shop. He said the network extension-oriented CentrumRemote fit his environment — a large population of telecommuters — for three main reasons:

- Users run very high performance applications, "and there is no way with our limited budget we could give them a duplicate PC to control" at the office.
- The product can handle multiple protocols simultaneously, which was critical for users transferring files off Unix hosts to a Novell, Inc. file server over a serial line.

This means "you have to be talking both protocols. Centrum and Digital Communications Associates, Inc. allowed you to do that, but [competitors] Shiva and Microtest didn't," Neuburger said.

- Centrum's licensing scheme required him to pay a flat $2,000 price for the server, whereas some vendors also ask for a per-user license fee. "We have a potential user base here of 19,000 people, so that could get into some money," Neuburger said.

The network extension form of remote access software, which shifts processing off the network onto the remote client, is becoming important with the emergence of client/server applications.

"We're doing a lot of client/server development, and we want to provide these applications to all users, local and remote," said Thes Hansen, technical consultant at MCA/Universal Studios in Universal City, Calif.

MCA/Universal uses Shiva Corp.'s LAN Rover/L modem-based product for linking Apple Computer, Inc. Macintosh computers over dial-up lines to a LocalTalk LAN. From there, users can tap into the rest of the corporate internetwork through bridges and routers on-site.

The LAN extension products are necessary because "client/server applications are written to specific networking protocols. With 'dumb' modems, you write that way and you're [in trouble]," said John Faig, senior research analyst at Meta Group, Inc., a research firm in Westport, Conn.

Bandwidth restrictions

The downside to LAN extension is limited wide-area bandwidth. However, products such as Telebit Corp.'s Netblazer include compression techniques to alleviate the problem.

Security is another issue. Mastercard International, Inc. is using the LAN Rover/L for a temporary project that has technical staff exchanging design documents between Orlando, Fla., and St. Louis. It has kept the installation isolated "because we're concerned with LAN security in general," said Tom DeWald, manager of technical development.

However, DeWald said that once his mainframe security vendor, Computer Associates International, Inc., moves its ACF2 security system to LANs, LAN extension is likely to pick up at Mastercard.

The players

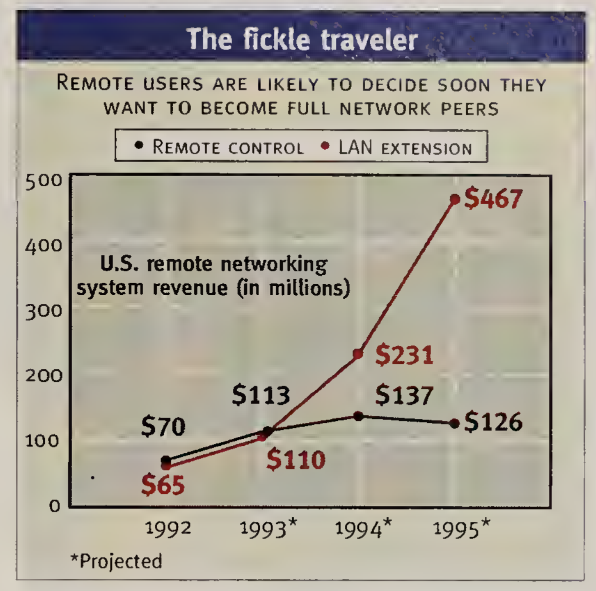
Here is a sampling of remote network access vendors:

Remote control
Microcom, Inc.
Norton-Lambert Corp.
Novell, Inc.
Symantec Corp.

LAN extension
Cayman Systems, Inc.
Centrum Communications, Inc.
Cisco Systems, Inc.
Digital Communications Associates, Inc.
Microsoft Corp.
Microtest, Inc.
Shiva Corp.
Telebit Corp.
Xylogics, Inc.

The fickle traveler

REMOTE USERS ARE LIKELY TO DECIDE SOON THEY WANT TO BECOME FULL NETWORK PEERS



Source: Forrester Research, Inc. CW Chart: Nancy Kowal

What you need

Remote access products on the market generally require the following:

- Host software running on an industry-standard desktop platform or a vendor-provided, bundled hardware/software server.
- Software on the remote clients.
- Modems at the host and remote sites. Some vendors bundle the modems with their host products; others allow users to choose their own.

Two in one

Some recently announced products blend the remote control and network extension forms of remote networking, allowing users to switch modes to fit the application they are running.

For example, for simply checking E-mail, users can operate in remote control mode; when they want to tap into distributed corporate resources, they can shift to LAN extension.

Citrix Systems, Inc. announced last week that it is shipping WinView for Networks — Novell NetWare- and Microsoft Corp. LAN Manager-compatible software that supports 10 concurrent remote users per application server at the host site.

WinView requires a 486 or Pentium-based PC as a host. Users pay $1,995 for server software supporting five users and $2,645 for 10 users. Five-user add-on packs cost $695.

Meanwhile, in early March, U.S. Robotics, Inc. in Skokie, Ill., bundled a function it calls Dynamic Access Switching into its Shared Access LAN modem for the switchable capability. Unlike Citrix, U.S. Robotics gives users a one-to-one relationship with host PCs.

"It would be appealing to have a switchable product," said Thes Hansen, technical consultant at MCA/Universal Studios. "Our systems analysts are responsible for maintaining our equipment, and remote control would be great for them. Executives are more likely to need LAN extension."

The two-in-one offering is a trend analysts said they expect to see spiral during the next few years.

—Joanie M. Wexler

Users to climb, not jump on SNMP-2 bandwagon

Despite benefits, migration questions remain

By Elisabeth Horwitt
SAN FRANCISCO

Simple Network Management Protocol (SNMP) Version 2.0 recently became "finalized enough to start a horse race" of vendors implementing the improved network management protocol, according to Steve Simon, senior telecommunications engineer at The Travelers Corp. The new version of the network management standard offers users a variety of benefits over the old, including secure communications, faster collection of management data and manager-to-manager communications.

However, users may face a tough migration path to reach these benefits.

The new version of SNMP recently won official status

SNMP-2, *page 84*

“No more de

Gary Slattery, Software Developer, Computer Associates

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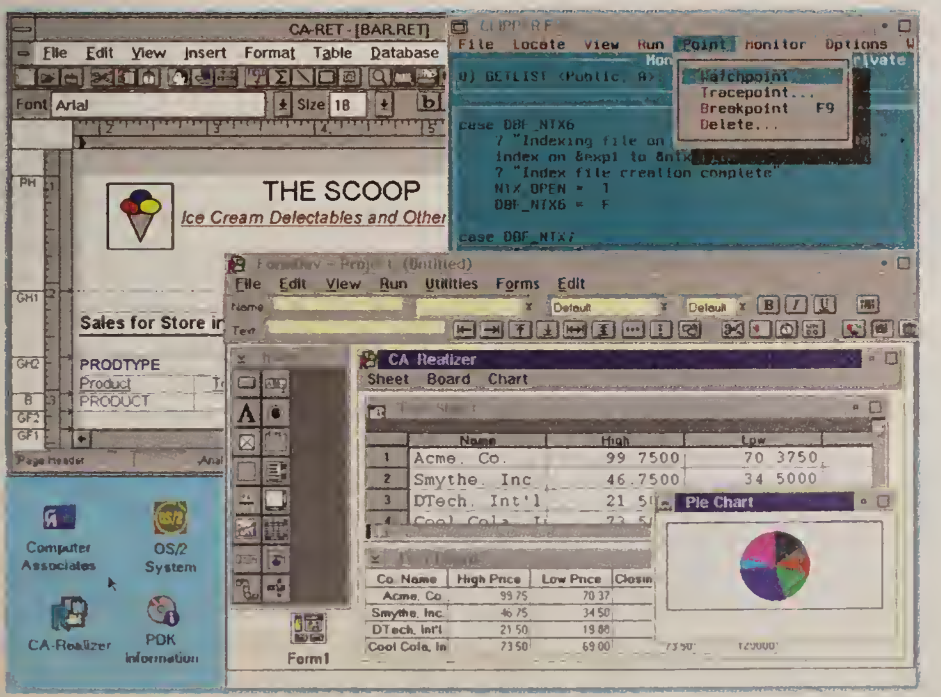

```
case DBF_NTX6
    ? "Indexing file on
    index on &expl to &ntx
    ? "Index file creation complete"
    NTX_OPEN = 1
    DBF_NTX6 = F

case DBF_NTX7
```

	Name	High	Low
1	Acme. Co.	99.7500	70.3750
2	Smythe. Inc	46.7500	34.5000
3	DTech. Int'l	21.5[illegible]	

Co. Name	High Price	Low Price	Closin
Acme. Co	99.75	70.37	
Smythe. Inc.	46.75	34.50	
DTech. Int'l	21.50	19.88	
Cool Cola, In	73.50	69.00	

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Commentary

Mark Eppley

Wires vs. waves

As an avid reader of 50 pounds of computer industry trade publications each week, I can't help but notice the media's cyclical pattern of devoting reams of column inches to the latest megatrend, such as the "year of the LAN" or the "year of the laptop."

Now it seems they have discovered radio-based data communications.

The "year" is now one of wireless communications — a technology sometimes billed as a connectivity panacea. Indeed, wireless certainly has its place; it is unlikely that any of us involved in computing will escape its effect during the next decade.

But users intrigued by the freedom wireless promises might want to examine closely the response time trade-off of today's products. Wireless technologies in their current form pose limitations for certain applications. If you support users who are doing any remote computing, you probably know these people have little tolerance for inferior functionality or performance compared with what they get when wired to the corporate internetwork.

The reality is that users with a direct 3270 connection to a host or running a 10M bit/sec. Ethernet network link achieve much greater performance than remote users connected over a radio-based packet network. The first reason is simply raw throughput disparities between today's wired and unwired worlds.

For example, the 1.2M bit/sec. throughput of a wired IBM 3270 terminal-to-host connection roughly compares with the 2.4K and 4K bit/sec. speeds of the Ardis and RAM Mobile Data packet data networks, respectively.

In addition, the architecture of the application will often determine if it is a viable candidate for living a wireless life. For instance, most terminal or client/server applications require a circuit-switched, real-time connection that a terrestrial network or modem transport provides. Unless an acceptable emulation scheme is provided, a wireless packet-based data transport would not be suitable because of bandwidth limitations.

In the data-over-cellular world (for which standards are still gelling), data traffic will take a back seat to voice by running in the "free space" when no voice is being sent. This, again, compounds bandwidth issues.

Radio network communications for these real-time applications could be compared with someone trying to have an urgent phone conversation with a person who doesn't own a phone and relies on his phone-equipped neighbor to shout his messages over the backyard fence. Not particularly efficient.

Wireless delays

Basic multiplication tables show us that a client/server application having a one-second response time for updating display information on a wired NetWare/Ethernet node would experience a 40 to 90 times greater delay over some vendors' wireless LAN connection.

It is doubtful, then, that a user accustomed to one-second response times would use the same application over a wireless node, if given a choice.

On the other hand, a short "bursty" application such as E-mail is very suitable to radio packet technology because it requires little bandwidth and works well in batch mode.

All of us will be doing some sort of "surfing" on the airwaves of the future. So it's not too early to start thinking about which application surfboards we need to build or modify to be able to ride the waves.

Eppley is the founder and CEO of Bothell, Wash.-based Traveling Software, maker of the LapLink portable communications product family.

Wireless benefits seen in cellular/digital link

By Ellis Booker

The first customer trial of a Cellular Digital Packet Data (CDPD) network will swing into operation later this year in Chicago.

The test is being conducted by Ameritech Corp. with an eye toward commercial service in Ameritech's multistate cellular region by the first half of 1994.

There are now more than 10,000 cellular radio "cell sites" in the U.S., and cellular carriers are keenly interested in leveraging this infrastructure for wireless data services. According to market research firm Booz Allen & Hamilton, Inc., there will be more than 13 million users of wireless data services by the year 2000.

More that 13 million people will use wireless data services by the year 2000.

The test will use IBM's CelluPlan II "overlay" technology for sending packetized data across idle voice channels on a cellular radio network.

Ameritech last week said it planned to examine a number of applications, including one- and two-way messaging, broadcast messaging to all receivers in a particular region or cell and multiple broadcast to receivers in numerous locations.

Derek Podobas, assistant director of mobile data at Ameritech's cellular division in Hoffman Estates, Ill., said the trial will likely involve four or five companies and 2,000 users.

While Ameritech's plans are emerging first, sources said other carriers in the cellular consortium will announce CDPD services shortly. Just last week, in fact, the leader of the cellular consortium, McCaw Cellular Communications, Inc., announced the formation of a wireless data division to support and promote CDPD networks.

Still, some analysts doubt whether the CDPD scheme will satisfy user requirements for wireless, on-the-go computing. Specifically, they question whether CDPD will be able to provide its promised 19.2K bit/sec. speeds.

"The effective speed you get on a wireless packet data network is not the same as you get on a circuit-switched, land-line network," said Ira Brodsky, president of Datacomm Research Co. in Wilmette, Ill. Brodsky estimated the actual throughput of CDPD networks will be more in the 3K to 4K bit/sec. range.

But Podobas noted that even in this case, CDPD networks will offer a data transmission capability two to four times greater than is possible today over typical cellular networks.

In addition, he said, a packet network offers other advantages, such as per-packet instead of per-minute pricing. Also, users would log onto the network once, instead of repeatedly dialing in, as with a circuit-switched network.

Electronic data interchange

EDI maturing as standards take hold

By Lynda Radosevich

Communication and software standards are helping reshape the once exclusively proprietary world of electronic data interchange (EDI). Several new standards-based products were announced at the EDI Conference in San Antonio, including the following.

- BT North America, Inc. in San Jose, Calif., unveiled X.400, fax, Systems Network Architecture (SNA) and Odette File Transfer Protocol (OFPT) options for its EDI Net value-added network.

BT's EDI services, based on the 1984 X.400 international standard for messaging, will be available in June 1993, and the company said it would support the X.435 EDI "envelope" part of the X.400 standard by 1994.

Support for OFPT, which picks up dropped sessions in the middle of transmission, is available now. The EDI Net-to-fax feature, due in June, will let users send EDI forms to trading partners' faxes. The SNA support will allow IBM users to exchange messages with non-SNA users.

- To help users migrate EDI off the mainframe, Texas Instruments, Inc. in Dallas added desktop and Unix packages to its mainframe line of EDI software. The TI software is based on the ANSI X12 and the United Nations' Edifact standards for EDI transactions. The Microsoft Corp. Windows-based desktop software can work with MCI Communications Corp. messaging and enables both EDI and messaging. Both desktop and Unix versions are due in mid-1993.
- General Electric Information Services in Rockville, Md., rolled out a Unix-based EDI server that combines translation software and communications interfaces on Hewlett-Packard Co. HP 9000, IBM RISC System/6000, NCR Corp. 3000 series and Sun Microsystems, Inc. SPARCserver workstations. Also, new $495 PC software lets smaller trading partners receive and print EDI documents.
- Digital Equipment Corp. announced that its EDI products will support the X.435 standard later this year. DEC also announced five ready-to-go EDI applications for manufacturing, accounting and logistics and direct communication connections for its customers to connect with Ford Motor Co., Chrysler Corp., General Motors Co. and Kmart Corp.
- AT&T EasyLink Services and Isocor said customers will be able to send EDI documents using the X.435 communications protocol via Isocor's Isotrade 400 software and AT&T's EasyLink network by midyear.

Other announcements included:

- The membership of the Accredited Standards Committee voted to align the U.S. X12 EDI standard with the international Edifact EDI by 1997. The move will allow U.S. businesses to trade and compete domestically and internationally with EDI-enabled businesses, said Jeff Sturrock, chair of the XIZ committee.
- The Data Interchange Standards Association, Inc. (DISA) awarded Burton F. Millard, Procter & Gamble Co.'s manager of EDI applications, its EDI Professional Award for his work in establishing EDI standards.
- A special DISA award went posthumously to Michael W. Gerus for his crusading EDI work in the automobile manufacturing industry. Gerus died last year.

What they make

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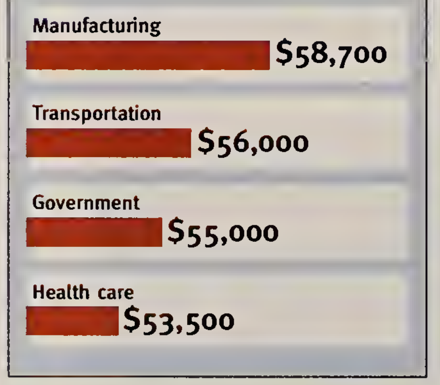

Source: EDI News salary survey

How many?

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Climbing on SNMP-2 bandwagon

CONTINUED FROM PAGE 79

as a proposed draft standard, approximately a year after it was first proposed to the Internet Engineering Task Force.

More recently, seven vendors demonstrated prototype SNMP Version 2 products at the International Symposium on Integrated Network Management last month.

Unfortunately, widespread commercial availability seems to be at least a year away.

At the demonstration, for example, only Sumitomo Electronics, a Fiber Distributed Data Interface vendor, had committed to providing SNMP Version 2-based end-user products within a specific time frame.

Migration questions

Even when products start appearing, migration questions may hold some users back from immediate implementation.

"It would be nice to start with SNMP-2" rather than implement the original SNMP and then have to migrate, Simon said. Travelers plans to begin implementing the network management standard in conjunction with the rollout of its corporatewide router backbone, which is still in the product selection stage, he added. "It would be nice to start with SNMP-2," Simon said.

The new version provides several features that Travelers wants in its internetwork management system. One is secured communications between management systems and managed network devices; another is the ability of the central system to collect multiple pieces of information from managed devices in one gulp.

The benefits of SNMP Version 2

- Secure communications between managing and managed devices.
- Peer-to-peer communications among different network management domains and nodes.
- Bulk collection of network management data.
- The ability to run over a variety of network transports, not just Transmission Control Protocol/Internet Protocol.

"If you are managing a lot of resources" using the older SNMP, collecting the necessary information "would take a lot of frames and a lot of network overhead," Simon said.

For companies that already have extensive SNMP installations, however, migrating to the new version may not be worth the bother. At Salomon Brothers, Inc., for example, "We already have our value-added products that are based on SNMP; moving to SNMP-2 means undoing some of the stuff we did," said Sam Malek, manager of technology support.

"Still, it would be nice to have a good crystal ball to see what things will be like in a couple of years," he added.

Vendors cited several potential strategies for easing users' migration woes. A likely tack will be for network management platforms such as HP's OpenView to support both SNMP and SNMP Version 2. This will enable users to take their time with the migration of SNMP agents that sit on network devices and systems and report key information to the management system. However, a mixed SNMP and SNMP Version 2 management system may not be so easy to administer, Simon said. "The trick for the network manager is keeping track of which device uses which protocol."

Most SNMP systems have discovery programs that automatically figure out what devices are on the network and what their configurations are. It would be useful if updated discovery systems could automatically figure out whether a device supports SNMP or SNMP-2, Simon said; otherwise, performing a common network management function such as collecting traffic data from a router would involve "negotiating" to find out whether the device supports the more sophisticated SNMP-2 features such as bulk data collection.

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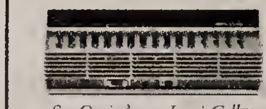

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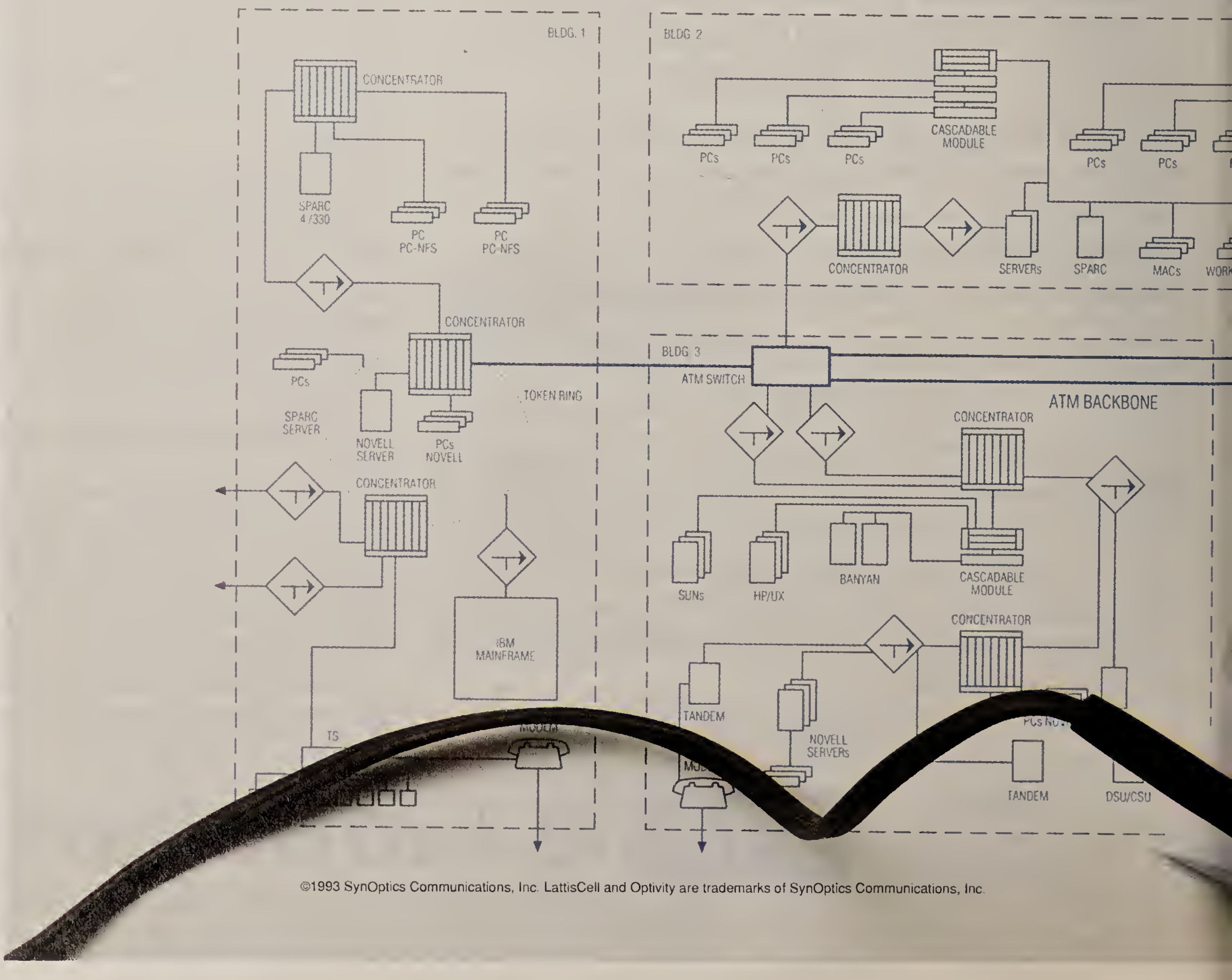

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SNMP management of SNA in the offing

By Elisabeth Horwitt

It is likely to be about a year before vendor working groups come up with the official standard for managing IBM Systems Network Architecture (SNA) devices via Simple Network Management Protocol (SNMP). Meanwhile, however, vendors are beginning to come up with their own prestandard products, targeting users who want to view their SNA and Transmission Control Protocol/Internet Protocol internetworking installations from the same management console.

A major move in that direction is Cabletron Systems, Inc.'s Spectrum/BlueVision.

The product is said to allow Cabletron's SNMP-based system, Spectrum, to exchange key management data with an IBM NetView host [CW, April 26]. It is due out this summer.

Cabletron has already provided some integration of internetworking and SNA through a joint development agreement with Irvine, Calif.-based Sync Research, Inc. The two companies have developed an intelligent card version of SNAC, which converts IBM Synchronous Data Link Control (SDLC) transmissions so that they can run on a local-area network or a LAN-to-LAN connection.

The card sits on Cabletron hubs, doing away with the need to have a separate box to perform the conversion, the vendors said. Announced last fall, the card began shipping earlier this year. In addition, Spectrum can manage the card as part of the hub, Cabletron said.

In sync with SNAC

Meanwhile, Sync Research plans next fall to deliver software that will enable any SNMP-compatible system to manage its SNAC line of SDLC-to-Logical Link Control converters. The software will include a management information base that sits on an SNMP system and allows it to check the status of devices that a SNAC is connecting to a LAN.

The SNMP system will also be able to check the status of the lines between a SNAC-equipped LAN and an IBM host, a Sync Research spokesman said. The software will be tailored to the type of connection — X.25, SDLC/leased line or frame relay, he added.

Sync's chief rival, Raleigh, N.C.-based Netlink, Inc., hopes to deliver by June a similar capability for its own SDLC Link Server family of products, a company spokesman said.

The product will satisfy the needs of users who want to extend SNMP management of interconnected LANs all the way to Netlink devices as well as to the IBM terminals and controllers they link to the LAN, according to the Netlink spokesman.

Both Sync Research and Netlink currently provide similar capabilities for managing their devices via IBM's NetView. Both companies are participating in the Internet Engineering Task Force working group to define a standardized way of managing such devices from SNMP.

MIBs

Management information bases (MIB) in the works define how an SNMP system can manage the following SNA devices/systems:

- **Advanced Peer-to-Peer Networking** (MIB developer: IBM)
- **LAN-to-SNA gateways** (MIB developers: Internet Engineering Task Force workgroup)
- **SDLC-to-Logical Link Control-2 converters** (MIB developers: IETF workgroup)

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Large Systems

RESTAURANT BEEFS UP SYSTEMS, 95
NEW PRODUCTS, 97

HDS users ponder plans for Unix server, host links

By Jean S. Bozman
SANTA CLARA, CALIF.

Hitachi Data Systems Corp. (HDS) users are solidly in the IBM-compatible mainframe camp, but the mainframe maker's recent announcement that it would support OSF/1 Unix got users' attention.

The Osiris Super Server, which includes Hitachi America Ltd.'s OSF/1 software and a network coprocessor to link mainframes with remote Unix local-area networks, was announced April 6 [CW, April 12].

Users said they have no immediate plans to use Osiris, but many are already considering ways to connect mainframes and Unix LANs.

MIGRATION TO OPEN SYSTEMS

Under consideration

The state of Wisconsin's Info-Tech data center in Madison has two big mainframes, an Amdahl Corp. 5995M-4550 and an HDS GX 8320 three-processor machine. Planners there have decided to install broad-based Transmission Control Protocol/Internet Protocol and Ethernet networks to support statewide client/server applications.

The new HDS Osiris software would fit into Info-Tech's blended mainframe/Unix network, but no decision to adopt Osiris has been made. "It certainly is being considered," said Neal Steinhoff, administrator of information technology services at Info-Tech. "However, we're still trying to figure out what our enterprise direction on open systems should be."

Clemson University in Clemson, S.C., has tried Osiris under a beta-test program. HDS' HI-OSF/1-M software was installed first, followed by Sun Microsystems, Inc.'s Scalable Processor Architecture-based network coprocessor in late 1992. Osiris was tried as a way to bridge the connectivity gap between Clemson's 3-year-old HDS EX 80 and a number of Sun and other Unix machines on campus.

The shakedown run for Osiris was done off-line, but the promise of on-line interaction between mainframes and Unix networks is still there. "We're moving more and more to open systems, but we have a huge suite of programs that run on the mainframe," explained Chris Duckenfield, vice provost for computing. "We don't see any chance of offloading all that work off the mainframe for the next five to 10 years."

But Duckenfield said the pricing of HDS' Unix solution is still a concern. "The economics of it are still unclear."

Another HDS user said the Unix software is appealing, but it does not answer one motive for moving to Unix: saving money through downsizing. "We're already seeing the economic benefits of shutting one of our mainframes down," said David Okimura, project manager at Associated Grocers, Inc. in Seattle. The $1.2 billion cooperative is leasing two aging HDS mainframes but turned one off in June when application development moved to PCs.

Pricing options

Osiris carries two price tags: The OSF/1 software ranges from approximately $2,500 to $25,000, depending on mainframe size, while the network coprocessor costs $150,000. Both products are available immediately. A hierarchical storage manager is set to ship in the fourth quarter, and support for an Oracle Corp. Oracle 7 database is expected in early 1994.

The impact of pricing is relative, some analysts noted. "It's an expensive solution to a non-HDS customer, but it's not a bad incremental cost if you already have Hitachi systems," said Jim Cassel, vice president and director of Gartner Group, Inc.'s Large Computer Strategies service. Cassel said the OSF/1 software supports symmetrical multiprocessing, making it a good Unix solution for mainframes.

Another analyst said HDS is moving too slowly into the Unix market, where sales growth is explosive. "They are moving so cautiously that, by the time they get this whole project out, they may have missed the ferry," said Marc Butlein, chairman of Meta Group, Inc. in Westport, Conn. HDS' Unix solution should have been more comprehensive from the start, including several Unix software tools, Butlein said.

Unix

Stratus prepares next step into open systems

By Melinda-Carol Ballou

For Stratus Computer, Inc., 1993 is the time to focus on and ship fault-tolerant software and middleware.

Last year, Stratus released its high-end Unix systems, and next year the company is slated to ship its line of platforms based on Hewlett-Packard Co.'s Precision Architecture-RISC chip.

While the overwhelming majority of Stratus' commercial customers still run on Stratus' proprietary VOS-based systems, many are now considering the move to Unix, according to John Jones, analyst at the San Francisco office of Salomon Brothers, Inc. Users interviewed recently said they were satisfied with the support and transition path provided by the company and look forward to the release of middleware for fault-tolerant Unix.

"Everything's running VOS right now, but somewhere down the line we will probably have some activities with Unix and connections with Novell for file-server activity over Ethernet," said Jim Fraser, manager of the MIS division of telecommunications and data processing at the Houston Department of Aviation.

Focus on Unix

A new version of Stratus' FTX Unix operating system, previously delayed but now expected to ship within the next two months, will enable the company to better target the high-availability Unix market, company officials said. Also slated for release later this year is middleware support for Transarc Corp.'s Encina transaction processing monitor, Novell, Inc.'s NetWare and the Open Software Foundation's Distributed Computing Environment.

Changes in FTX Release 2.2, which officials said will make it "equivalent in functionality to VOS," include symmetric multiprocessing and a rewrite of the virtual memory manager to eliminate Unix "panics"; full support of remote service network; a "powerfail" ride-through capability so that systems will stay operational after a power failure to enable an orderly shutdown; and the ability to reconfigure the system on-line for planned downtime, according to Jim Holley, director of product marketing at Stratus.

"We also increased the granularity of our locking mechanisms to address the issue of multiple processors accessing

Stratus, *page 90*

Holiday Inn won't let go of its big iron – yet

By Rosemary Cafasso
ATLANTA

Holiday Inn Worldwide's Americas Division is taking the first steps into client/server computing and is finding that it will be later rather than sooner before it reaps any big benefits.

The company, which manages 100 hotels in North America (the other 1,600 Holiday Inn facilities are franchise operations), is a long-time Dun & Bradstreet Software shop, running several financial applications on an IBM mainframe. In 1992, it licensed D&B Software's SmartStream client/server software and launched a pilot project in October. The pilot, a profit-and-loss analysis application, was rolled out to one 22-hotel Holiday Inn region. The graphical front end was a big improvement from the host-based applications, and SmartStream took care of the networking and data access hassles of downloading host data to the new application.

But today "we are basically on hold," said David Peach, vice president of finance.

Not that the pilot did not go well or that Holiday Inn has received anything but "exceptional" support from D&B Software, according to Peach. The problem lies with a feature not yet developed by D&B Software to synchronize account codes in the SmartStream profit-and-loss application with account codes on the host.

Peach said this missing piece would have been a nonissue if the application were static. But, as work increased on the pilot, Peach's team realized that account codes were frequently being added to the mainframe database, and these changes were not being reflected in the downloads to the SmartStream platform.

To accommodate the changes, the group set up a process to manually track account code changes and load them into SmartStream. But Peach said the team soon realized this time-consuming task was starting to offset the bene-

Holiday Inn, *page 94*

ON SITE

Holiday Inn
Atlanta

Goal: To provide financial data to users in a more usable format.

Strategy: Implement client/server software and interface with financial applications on the host.

MTI improves access to high-performance SCSI

By Melinda-Carol Ballou

Micro Technology, Inc. (MTI) is shipping a new series of Stingray storage servers targeting I/O-intensive, mission-critical applications in Digital Equipment Corp. environments. Dubbed Stingray Gemini, the product offers the hot-swapping, dual porting and auto failover capabilities previously available with Stingray.

It also provides double the performance, twice the number of ports and twice the number of DEC's Computer Interconnect attachments and devices supported by Stingray.

Gemini delivers up to 1,500 I/Os per second balanced across two Computer Interconnect-based servers and six high-speed Small Computer Systems Interface (SCSI) array controllers. It optimizes disk I/O via overlapped seeks and seek reordering, features that are not available with other disk subsystems. MTI's disk caching software is also included with Gemini.

Each processor contained in Stingray Gemini is an independent storage server that allows I/O to be segmented for I/O-intensive applications where the heavy read/write load is spread among two Stingray Gemini server engines and six SCSI interfaces, company officials said.

"SCSI is a single-bus device with one common bus structure. With Stingray Gemini, we created a dual-channel interface to bring two independent SCSI I/O channels to each drive," said Tom Raimondi, vice president of marketing at MTI. He added that DEC, in comparison, offers two servers accessing one SCSI device.

Gemini Stingray is shipping and is priced starting at $50,000 with 14 ports.

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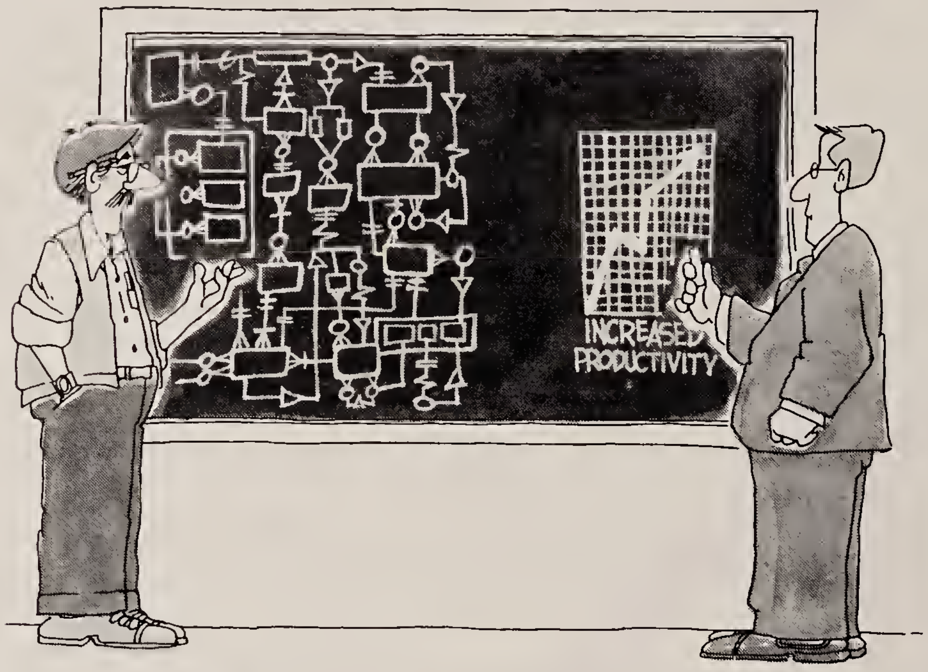

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Stratus prepares for open systems

CONTINUED FROM PAGE 89

a similar piece of the operating system," Holley said. "We're excited about Release 2.2 because the demand for fault-tolerant Unix is great not just from telecom and typical markets, but we're seeing growing interest in the commercial sector as well."

Some users said they have received good support from Stratus on the proprietary side and are considering making the transition to Unix.

"I've been very satisfied with their support," said John Lane, chief information officer at the Securities Exchange Commission (SEC) in Washington, D.C.

Although much of the SEC's contact with Stratus support is through a systems integrator, Stratus officials became directly involved last year when a power spike brought down the SEC's system.

"They did a terrific job working in their labs and actually identified the problem — which had nothing to do with their system — and rectified it," Lane said.

He added that the SEC is examining the possibility of moving from VOS-based Stratus systems to Unix for its Electronic Data Gathering and Retrieval filing system.

"The advantage of staying with VOS means we can [upgrade] at lesser cost. The trade-off on the Unix side is higher up-front costs initially but the ability to modularize better and then change pieces of the system [as we need to]," Lane said.

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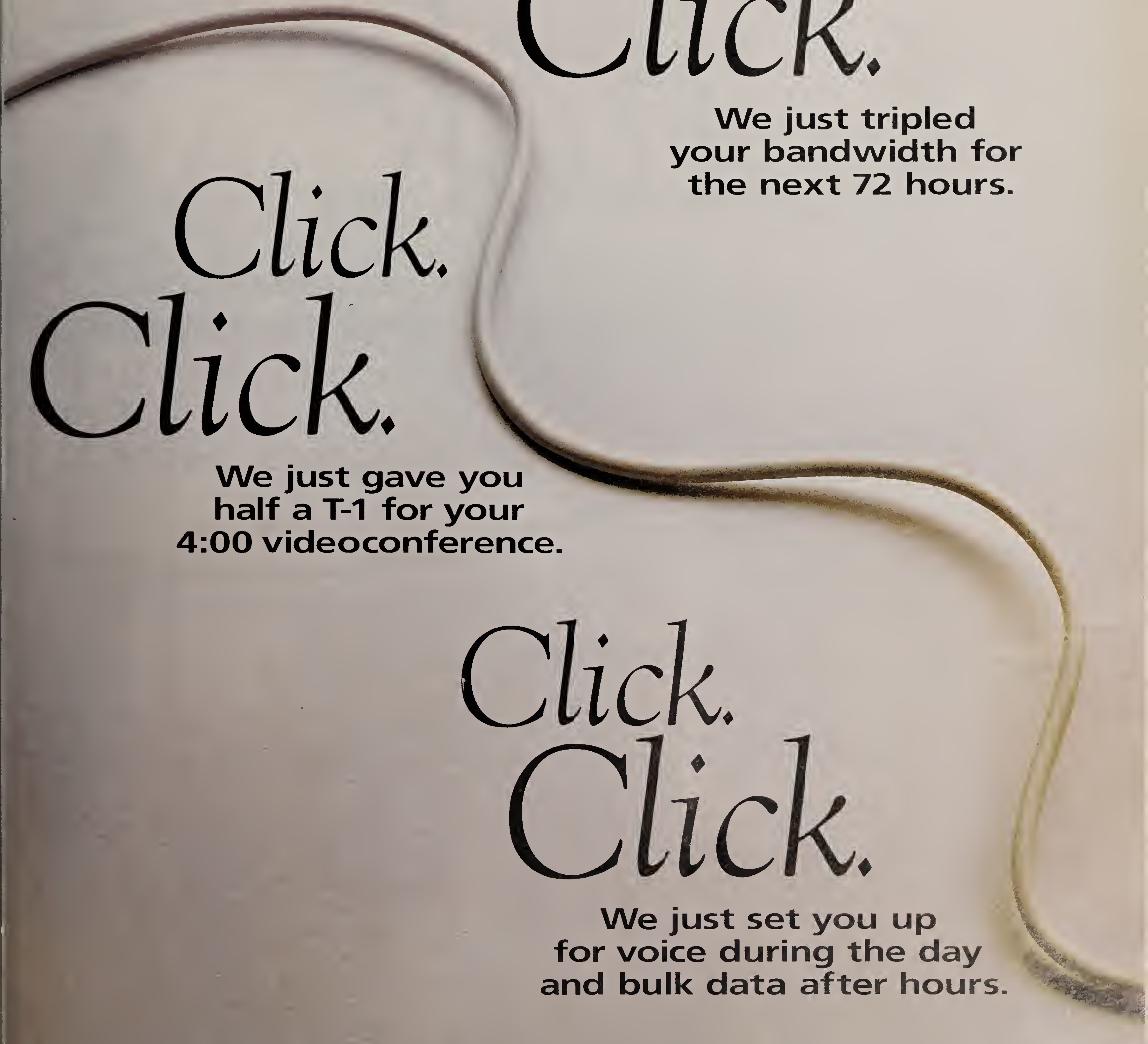

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Multimedia to save hotel time, money

By Michael Fitzgerald

ATLANTA

Holiday Inn Worldwide, which laid claim to developing the first automated hotel reservation system, said it believes it has broken new ground for its industry by using multimedia technology for staff training.

The 1,700-hotel chain said its efforts probably make it the largest single corporate user of multimedia technology and could save it millions of dollars.

"We have already seen our [system] implementation team cut its time from 14 days to six days," said Jewell DeWeese, vice president of franchise system education and training at Holiday Inn Worldwide, which is a Bass PLC subsidiary.

Holiday Inn is using its new multimedia capabilities in select hotels to help install a new property management system designed in conjunction with Encore Systems, Inc.

Typically, front-desk employees use a mouse to click on various features on a screen, such as a computer or customer, and the selected item "talks" to the user. Or, a manager might have a screen where employees, for instance, present various concerns that must be addressed.

The multimedia portions of Holiday Inn's new systems were developed by Atlanta-based FloydDesign, and the first CD-ROM training module, devoted to rate and inventory management, was built by MicroMentor, Inc. in Cambridge, Mass.

John Lipscomb, manager of research and development for multimedia at Holiday Inn, said each hotel receives one IBM Personal System/2 Model 57SLC Ultimedia box with IBM's OS/2 with Multimedia Extensions installed.

Holiday Inn said it intends to have 500 hotels using multimedia by Oct. 1 this year and will complete the rollout by October 1994.

The Encore system, which will be installed in all Holiday Inn locations by July, requires 12 hours of training, and a new Holiday Inn Reservation Optimization system requires three hours.

The impetus for the training effort came from turnover rates, according to the company.

"Within six months [of opening a new franchise], you have substantial staff turnover," DeWeese said. "We thought multimedia gave us a way to sustain the skill levels of the hotel staff."

Holiday Inn

CONTINUED FROM PAGE 89

fits the company would gain from the client/server application.

Curently, Peach's team is working with D&B Software to come up with a fix to "bolt on" the SmartStream application so code changes from the host will be automatically reflected in the server environment.

Problem solving

Bobby Cameron, D&B Software's director of product management for decision-support applications, said Holiday Inn has run into "a classic distributed data problem. We are definitely working on that problem."

Cameron said SmartStream Release 1.0, which Holiday Inn licensed, was intended to deliver data to the client/server world. D&B Software is aiming to provide a synchronization function in Release 2, expected this summer.

Until Holiday Inn gets its fix, it will not roll out the software to its other regions, Peach said.

So far, Holiday Inn has invested approximately $200,000 in new hardware and software for the project. Peach said the company is still committed to the promises of client/server but is less starry-eyed than before.

Peach said he believes one source of difficulty comes from expectations. People expect client/server applications to be as stable as mainframe programs and as user-friendly as desktop packages, he said.

They may forget that client/server is still very new technology, he added.

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Eatery swaps dollar-hungry mainframe for lean HP mini

By Mark Halper
SAN DIEGO

ON SITE

Ask steakhouse chain operator The Paragon Restaurant Group, Inc. where the beef is, and the answer could be "anywhere but in the computer room."

After spending years on a meaty IBM 3090 run by outsourcer Litton Computer Services, the operator of 76 Hungry Hunter and Mountain Jack's steak restaurants now conducts daily computing business on a Hewlett-Packard Co. Unix minicomputer, the HP 9000 Model 845.

And after a gristly cutover, the company is now seeing dividends. Paragon is saving about $700,000 a year on processing fees, information systems director Kevin Mead said.

Paragon's decision stemmed from a change in business operations some 2½ years ago, when the company established three subsidiaries that corresponded to what were then its three restaurant themes: steakhouses, seafood and Mexican.

With each of the three operating independently, the need for big iron processing disappeared. "No one of the three was large enough to support a mainframe," said Mead, noting that Paragon has since sold its seafood and Mexican restaurants and has itself been purchased by Japan's Kyotaru International.

In making the computing switch, Paragon reviewed three suppliers: IBM for its RISC System/6000, Digital Equipment Corp. for its VAX line and HP.

Mead said the company eliminated DEC "because we really didn't know them that well," and while the RS/6000 could have met the firm's needs, "We would have been at the top of [IBM's] line with no growth path."

Paragon's Kevin Mead: *Downsizing led to beefy savings*

While the HP system works well today, the switch from the mainframe was not exactly as easy as slicing filet mignon.

Converting a critical mainframe-based cash and sales program that tracks coupons and gift certificates was going to be a monstrous project because the program was based on CICS Cobol, "an environment that does not exist in Unix," Mead said. Rewriting the code would have cost $300,000 to $400,000.

So the company used a CICS Cobol emulator supplied by VI Systems, Inc. in Dallas, at about one-tenth the cost of a conversion, Mead said.

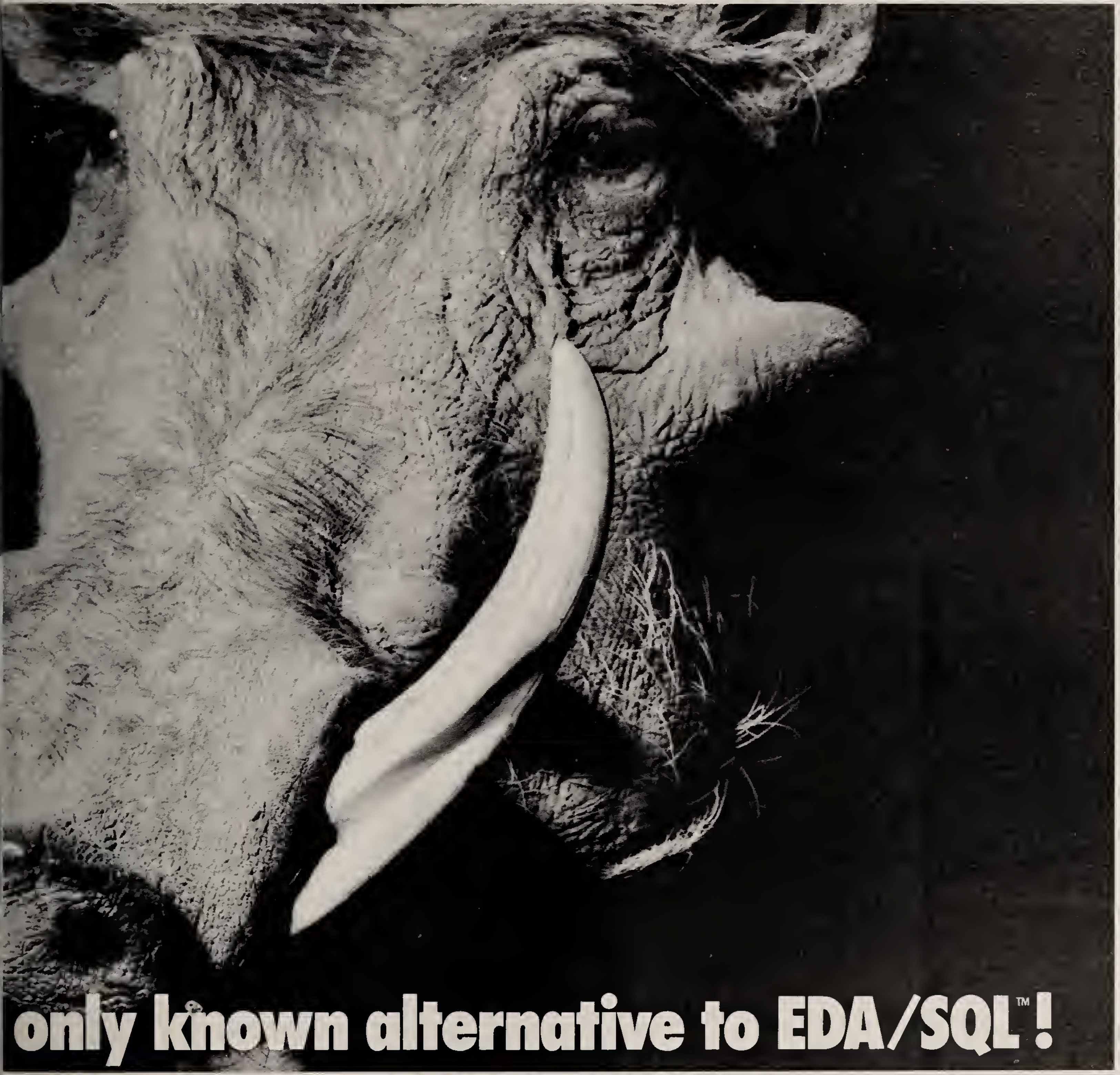
"The project basically failed at first," Mead said. After five months of difficulties, "we were back to square one looking at a conversion," Mead said. VI Systems eventually addressed the problems.

Conversion of a Management Science America, Inc. accounting package to a Stevenson Financial Service, Inc. program was less problematic. The biggest issue surrounding it, he said, was training end users in the new program.

Another conversion — of a point-of-sale system supported by outsourcer Martin Marietta Corp. — entailed recompiling Cobol code. It proceeded relatively error-free, Mead said.

Paragon has upgraded the HP 9000 once, from a Model 835 to a Model 845, as it expanded from 53 steakhouses to its present 76. Mead said Unix has not been as difficult to learn as some people think it is, but he conceded that while it did not take long to master the fundamentals, "we are still learning today."

Mead's recollection of long nights during the cutover process prompted the question of whether he would do anything differently a second time around. His answer: He would convert each package individually, not all at once.



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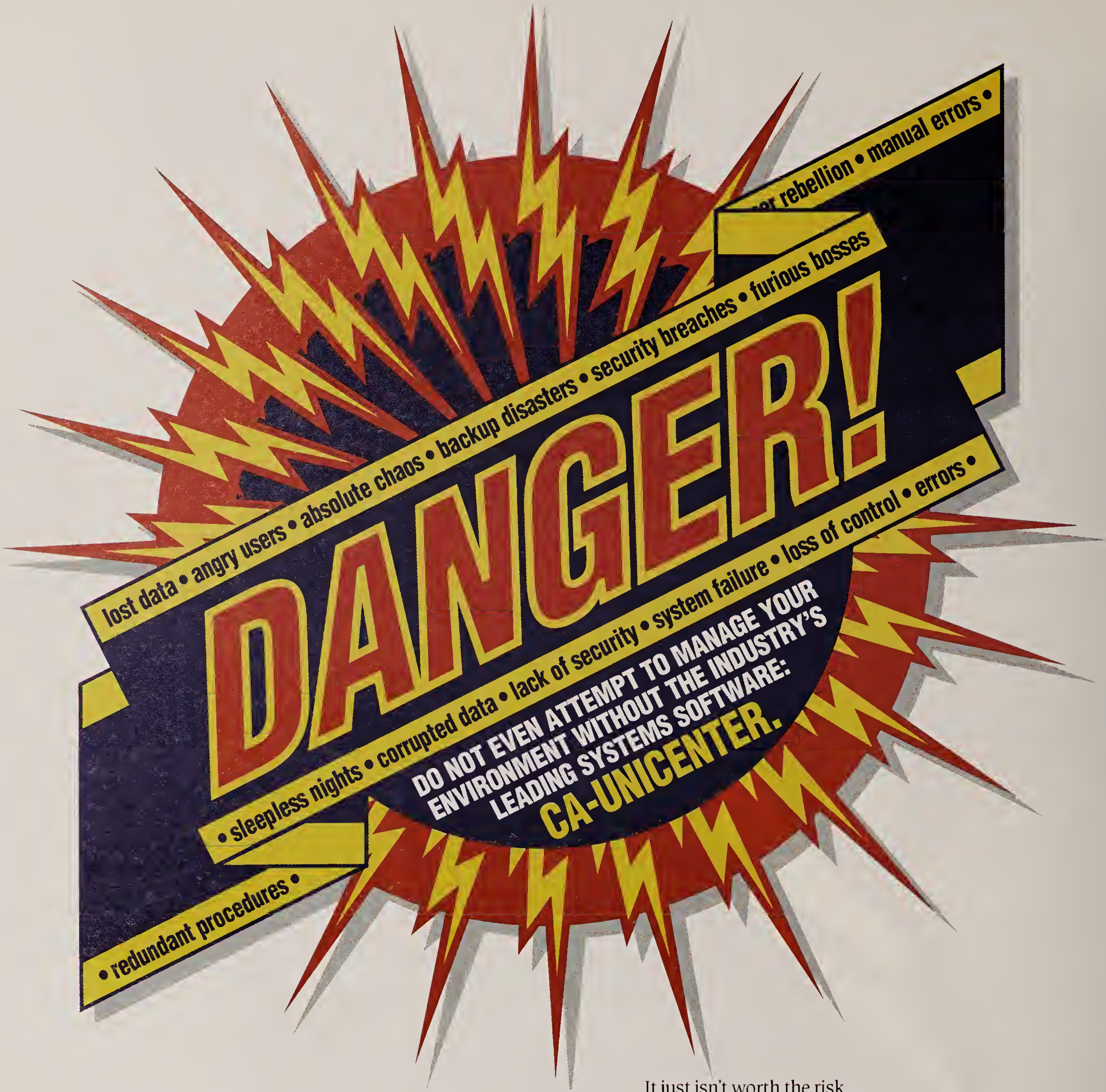
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New Products

Utilities

BMC Software, Inc. has announced Version 3.4 of Copy Plus, a copy utility designed for IBM's DB2 database management system.

Version 3.4 now copies the DB2 Catalog and Directory table spaces and includes a free space-consolidation option that enhances data compression.

CPU-level prices start at $12,000 for a perpetual license.

▶ *BMC Software*
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Kisco Information Systems has introduced the Object Compression Manager.

The product is a utility designed to activate and maintain object compression on IBM's Application System/400. According to the company, object compression can significantly reduce the amount of disk space needed to help text panels, menus, display files, printer files and store programs. A schedule is created for regular recompression of decompressed objects, keeping disk savings from compression.

A onetime per-machine license fee costs $300.

▶ *Kisco Information Systems*
Suite 123
120 Beverly St.
Mt. Kisco, N.Y. 10549
(914) 241-7233

SofTouch Systems, Inc. has announced Version 3 of CICS Windows, a CICS Multi-Sessions Manager.

Features include on-line customization, concurrent window sessions, CICS release support and dynamic hot keys, among others. A message broadcasting feature enables users to send messages to any other user or group.

Without reprogramming, the Help-windows feature allows users to add Common User Access-compliant on-line Help to any CICS application. The menu generation feature permits users to create menus that automatically pop up when specific transactions end or the screen is cleared, the company reported.

Prices start at $6,300 for a permanent license on a single CPU running DOS/VSE and $10,500 on an MVS machine.

▶ *SofTouch Systems*
Suite 600
1300 S. Meridian
Oklahoma City, Okla. 73108
(405) 947-8080

Advanced Software Products Group, Inc. has introduced Version 5.0 of Spacecalc.

The product is an interactive direct-access storage device and VSAM Modelling Utility. According to the company, Spacecalc Version 5.0 was created to eliminate the guesswork in calculating allocation requirements by hand.

Prices range from $6,900 to $11,900.

▶ *Advanced Software Products Group*
995 8th Ave. South
Naples, Fla. 33940
(813) 649-1548

Data storage

IPL Systems, Inc. has introduced the 7737 Disk Array, an IBM 9337-compatible subsystem for IBM Application System/400 users.

The product is said to be the first AS/400 subsystem to offer users a choice of redundant arrays of inexpensive disks implementation in one unit.

By pushing a button on the front display panel, users can pick which IBM 9337 mode they want to emulate, along with the protection level. The product can be configured for full compatibility with IBM Models 010, 020, 110 and 120, the company said.

A fully configured subsystem costs $42,000.

▶ *IPL Systems*
60 Hickory Drive
Waltham, Mass. 02154
(617) 890-6620

Baber Information Services, Inc. has announced a modular package that consists of four utilities for IBM's Application System/400 Disk Management.

The company said the Disk Saver helps maintain storage requirements at a minimum by finding and managing unnecessary space allocated by the user application or the operating system.

The Disk Analyser enables users to optionally archive objects to tape by analyzing objects that are on the system and determining which ones are obsolete. The source file is compressed by up to 80% with the Source Manager.

The Backup Manager automates backup procedures and records where each object or library is stored.

Prices range from $1,500 to $4,800.

▶ *Baber Information Services*
4417 N. O'Connor Road
Irving, Texas 75062
(214) 650-0506

Application packages

QCC, Inc. has announced the Credit Receivables and Deduction (Credt) Management System.

The product is used as a front-end application solution that operates on all IBM Application System/400 models. Earned and unearned deductions can be tracked, controlled and monitored. Credt assists in resolving customer claims, enhances control of claimed deductions and improves the collection process, the company said.

Prices range from $7,500 to $35,000 per client license.

▶ *QCC*
886 Washington St.
Dedham, Mass. 02026
(617) 329-7626

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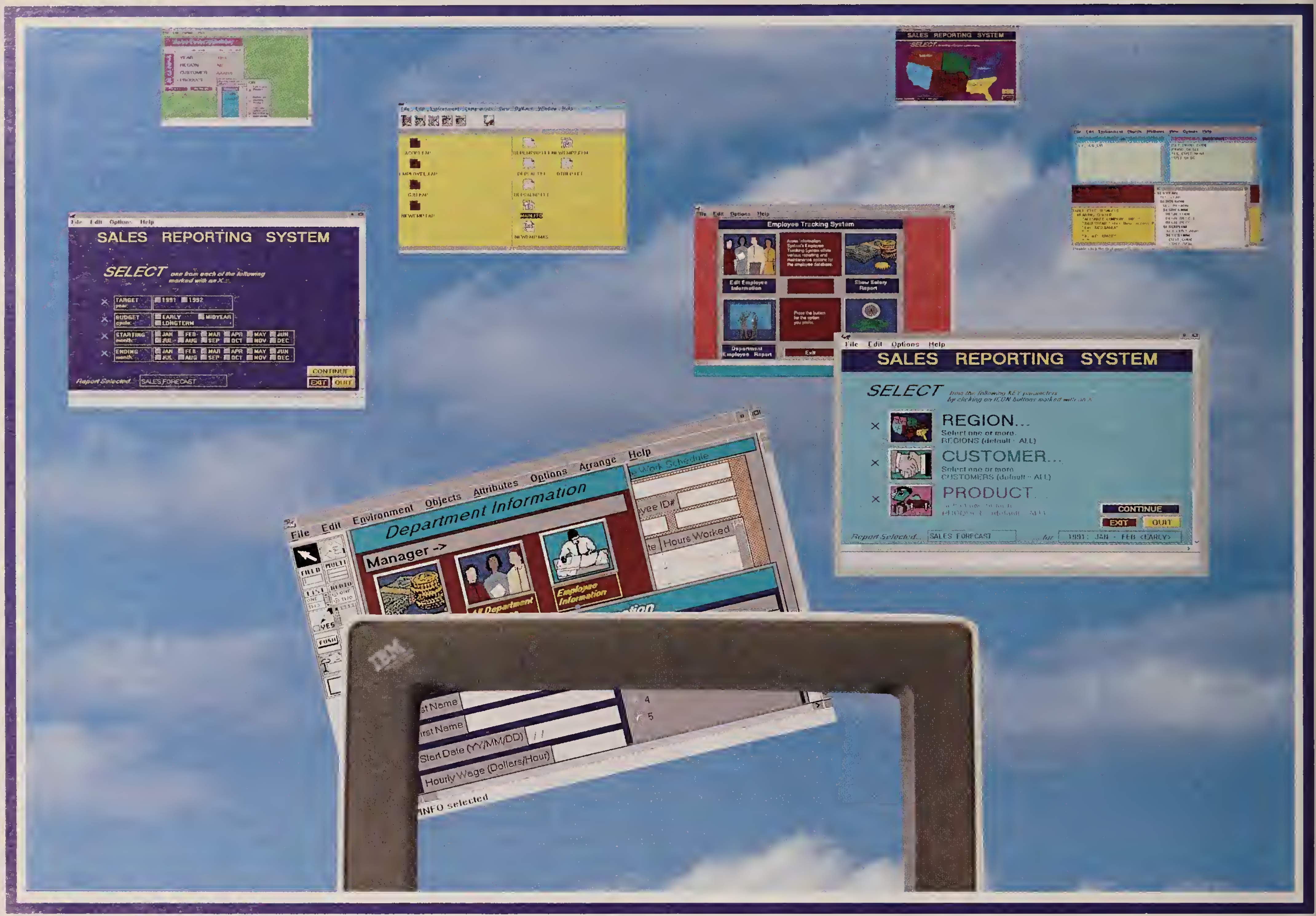

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Languages
Tools

Application Development

EcoSystems upgrading DBMS
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New products, 102

Measurement programs need vision

By Garry Ray

Growing interest in software measurement did little to buffer underlying skepticism at the semiannual meeting of the International Function Point Users' Group earlier this month in New Orleans.

"Half of these people won't be here in two years" because their measurement programs will fizzle, Howard Rubin, a conference speaker, said of the event's 280 attendees. Rubin, a professor of computer science at Hunter College, explained that measurement programs must be "congruent with the goals of the organization" to be successful.

Because "most information technology groups can't even describe what value they add to the company," it is not surprising that they often cannot describe the benefits of a software measurement program, Rubin said.

Despite evidence that function point and other software measurement programs are gaining broad interest in development shops — International Function Point Users' Group rolls have grown by more than 100% per year since 1989 — common lore indicates that only one out of six measurement programs reaches the second-year mark.

Function point analysis provides techniques to count the number of software functions delivered to users of an application. The resulting tally of "function points" can then be used by development shops to track productivity, costs and efficiency. Function point programs are typically used with other "quality management" initiatives within a company. But the techniques can be useless if improperly implemented.

Software measurement experts said the high failure rate of metrics programs has a number of causes that can easily be avoided.

Heading the list of problems, they said, is that measurement enthusiasts rarely bother to sell the benefits of their programs to senior information systems or business management. "Measurement programs in shops without the support of the rest of the organization have failed," said Charles Douglis, president of Software Productivity Research, Inc., a measurement consultancy in Burlington, Mass.

Also doomed are programs that have no larger business goal, said Andy Belden, president of the Cincinnati-based International Function Point Users' Group. "People who say, 'We want to do function points' without a plan eventually crash," he said. "Then they ask, 'Why did we do it?' "

All the right stuff

But the high failure rate is balanced by programs that have been properly launched.

Mead Data Central, an information technology company in Dayton, Ohio, created a department specifically responsible for software measurement and metrics. Alec Johnson, manager of processes and metrics at the company, said his seven staff members have become part of the overall development process for Mead's 1,000 programmers. "You can't leave certain key phases of [Mead's] development methodology unless you have cooperated with my department," he said. The department participated in more than 200 software development projects during the last year, he said.

Such a mandate is unusual in development shops. But Johnson said proactive "marketing" of his department is another key success factor. "We have 'bicycle tours' where we go to other departments and explain what we do."

The department also publicizes its successes through monthly presentations to development managers (Johnson calls them "productivity flashes") and "a lot of work with individuals" in other departments, he said. As the department refined its approach to analysis, marketing and presentation, Johnson found that "senior and executive management's appetite for this material is voracious."

In the end, that meets Rubin's key determinant of the success or failure of a measurement program: "The first criterion is that metrics are used by management to make decisions," Rubin said.

Take note

Measurement practitioners say **a successful program**:
- Has strong support from senior management.
- Demonstrates business value to line management.
- Is continually "sold" to the organization.
- Is used to make business decisions.

A failing program, on the other hand:
- Is used for individual performance appraisal.
- Does not provide business measures to management.
- Is segregated from other quality or software development programs.
- Is underfunded.

Hurricane Andrew's aftermath

Miami paper gets Pulitzer thanks to stats analyses

By Gary H. Anthes
MIAMI

To the age-old criteria of tenacious reporting and agile writing, add information technology smarts to the list of skills helpful in landing a top prize in journalism.

According to Stephen K. Doig, research editor at the *Miami Herald*, computer-assisted statistical analyses were essential to the preparation of a package of stories on Hurricane Andrew that recently helped the newspaper win the Pulitzer Prize for public service.

Doig, a former reporter who traded his notebook for a computer terminal, used an IBM mainframe running software from SAS Institute, Inc. to sort through millions of records on property damage, property-tax assessments, building inspections and political contributions in South Florida.

The analyses turned up several "smoking guns," Doig said, and supplanted anecdotal evidence to reveal the devastating contribution to human misery made by a relaxation of building codes, shoddy construction and fraudulent inspections during the building boom of the 1980s.

Doig combined a file of 60,000 post-hurricane damage reports with 100,000 property-tax records to discover whether the amount of damage a house sustained was linked to its value, size, construction materials, age and other variables.

"The only strong correlation was with the year built," Doig said. "The newer the house, the worse it tended to do."

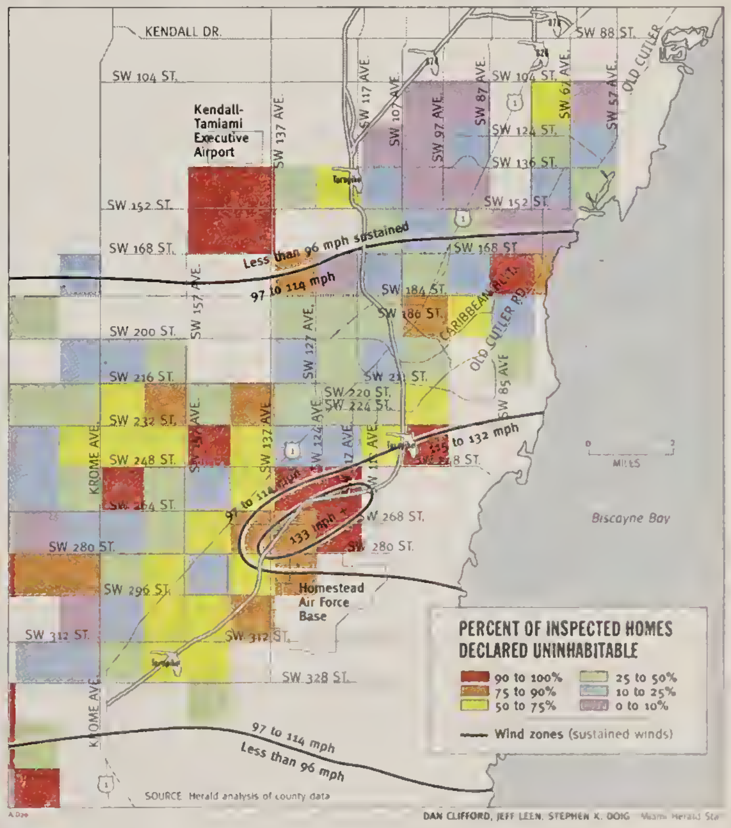
Mapping it out

To help visualize the patterns, Doig produced maps from geographically coded SAS output using a PC running AtlasGIS, a geographical information system mapping package from Strategic Mapping, Inc. in San Jose, Calif.

Armed with the computer output, reporters were able to show that a successive builder-urged relaxation in building codes — for example, allowing the use of roofing staples instead of nails — led to a 68% greater likelihood that houses built after 1980 would sustain more serious damage than those built earlier.

The *Miami Herald* unearthed another contributor to the devastation caused by the hurricane. After loading 7 million home-construction inspection records from 35 magnetic tapes

Pulitzer, *page 101*

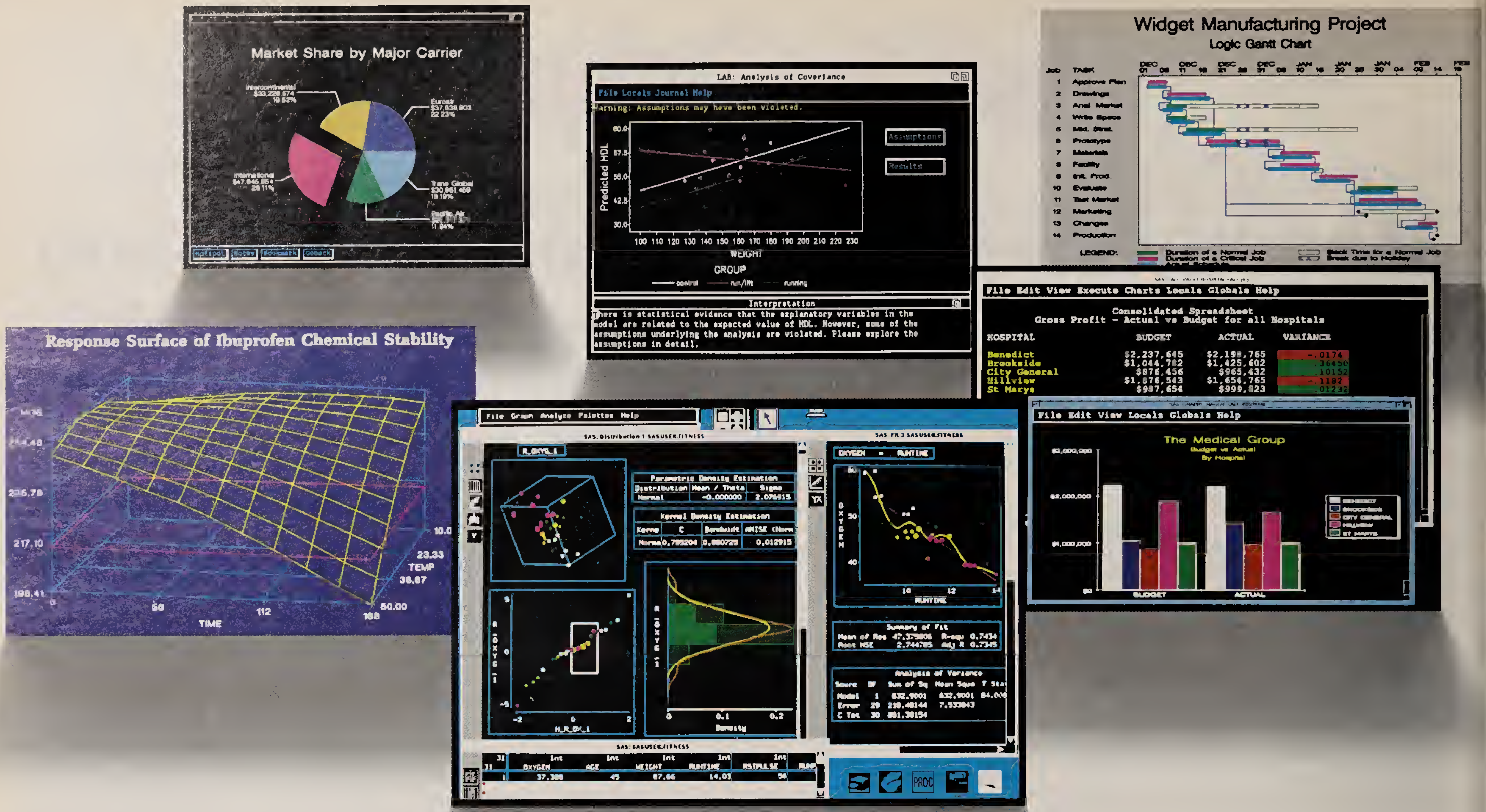


DAN CLIFFORD, JEFF LEEN, STEPHEN K. DOIG Miami Herald Staff

This computer-generated map, *which helped* The Miami Herald *win its Pulitzer Prize, shows the percentage of homes in South Dade declared uninhabitable after the hurricane*

Piece of the prize

When *Miami Herald* research editor Steve Doig has a question about SAS software, he often sends it to SAS-L, an Internet electronic-mail list of SAS users. Two weeks ago, he broadcasted a message to SAS-L about the newspaper's recent Pulitzer Prize: "I know I couldn't have pulled it off without all I have learned from the SAS-L folks in the past year or so. So, thanks for that help — you all can honestly say you earned a piece of a Pulitzer this year."


Market Share by Major Carrier
Widget Manufacturing Project
Logic Gantt Chart
LAB: Analysis of Covariance
File Locals Journal Help
Assumptions
Results
Predicted HDL
WEIGHT
GROUP
control
run/lift
running
Response Surface of Ibuprofen Chemical Stability
TIME
TEMP
File Graph Analyze Palettes Help
SAS: Distribution 1 SASUSER.FITNESS
SAS: Fit 3 SASUSER.FITNESS
File Edit View Execute Charts Locals Globals Help
File Edit View Locals Globals Help
The Medical Group
Budget vs Actual
By Hospital
BUDGET
ACTUAL

Warning: Assumptions may have been violated.

Interpretation

There is statistical evidence that the explanatory variables in the model are related to the expected value of HDL. However, some of the assumptions underlying the analysis are violated. Please explore the assumptions in detail.

Consolidated Spreadsheet
Gross Profit - Actual vs Budget for all Hospitals

HOSPITAL	BUDGET	ACTUAL	VARIANCE
Benedict	$2,237,645	$2,198,765	-.0174
Brookside	$1,044,782	$1,425,602	.36450
City General	$876,456	$965,432	.10152
Hillview	$1,876,543	$1,654,765	-.1182
St Marys	$987,654	$999,823	.01232

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Pulitzer Prize

CONTINUED FROM PAGE 99

obtained from Dade County, statistical analyses turned up anomalies such as inspectors who reported having made as many as 80 inspections in a single day — about four times the maximum number thought feasible.

"There had been grand jury investigations done sort of anecdotally," Doig said. "An undercover agent would follow an inspector and find, for example, that while he was supposed to be inspecting, he was off bowling."

Computer analysis pinpointed other "anecdotes" used in the newspaper's coverage — for example, that a contractor convicted in 1986 of bribing an inspector to approve roofing jobs had built 30 houses left uninhabitable by Andrew.

A contractor convicted in 1986 of bribing an inspector had built 30 houses left uninhabitable by Andrew.

To support another computer-assisted analysis, the newspaper created a database by keying information about 17,200 local political contributions since 1980. That revealed a cozy relationship between building interests in Dade County and elected members of the county Metro Commission, which has final say on building code revisions.

"In 1986, when construction was booming, the building industry gave [Metro] at least one of every three campaign dollars," the paper reported in the story "Do builders' bucks buy political power?"

Doig said the newspaper's report is now paying dividends. "The construction code has been stiffened," he said. "A new code about to go into effect will address a number of the problems that led to the patterns we found."

Doig said there are about 30 newspapers in the U.S. able to do "database reporting" — inferring trends, patterns or other useful information from raw databases. But he cautioned against confusing high-technology tricks with old-fashioned journalism skills.

"When you use a computer like this, it doesn't tell you why," he said. "It just tells you what happened, and you still have to do traditional reporting to find out why that pattern was there."

Rocking Florida's foundations

The following excerpt is from *The Miami Herald*'s "Special Report: What Went Wrong," a 16-page Dec. 20, 1992, report that shocked South Florida and helped the newspaper win a Pulitzer Prize.

"Like a latent fingerprint found at a crime scene, a clear pattern has appeared in the vast sprawl of destruction left by Hurricane Andrew.

"The storm's deadly imprint emerged from a three-month *Miami Herald* investigation that used computers to analyze 60,000 damage inspection reports.

"A computer created a color-coded map showing how 420 neighborhoods weathered the storm [see page 99]. When a map of estimated wind [speeds] was superimposed over the damage, the pattern became unmistakable: Many of the worst-hit neighborhoods were far from the worst winds. . . .

"The computer analysis shows widespread destruction in areas where the sustained wind speed appears to have been far below the 120-mile-per-hour standard mandated by the South Florida Building Code."

In Brief

TI to play Pipes

Texas Instruments, Inc.'s Information Technology Group and **PeerLogic, Inc.** have announced an agreement under which TI is purchasing a minority equity position in PeerLogic and will become a worldwide distributor of PeerLogic's Pipes. Pipes, a middleware product suite, is said to facilitate building multivendor distributed computing systems. TI will also incorporate Pipes in its computer-aided software engineering tool, Information Engineering Facility.

Powersoft building interface

Powersoft Corp., whose stock has soared up the charts since going public in early February, recently signed a joint marketing and development deal with **Popkin Software Systems, Inc.** in New York. The firms plan to build a **Microsoft Corp.** Windows interface between Popkin's System Architect front-end development tool and Powersoft's PowerBuilder generation product. The interface, SA/PowerBuilder Link, is due in the second quarter of this year; it will cost $1,995.

Tool for SPARCstations

Fremont, Calif.-based **International Software Automation, Inc.** recently introduced Panorama C++, a development tool for designing, generating, debugging and testing Unix applications. The $8,000 product, which is discounted to $2,800 through May 15, runs on **Sun Microsystems, Inc.**'s SPARCstations.

The solution to your DOS/VSE, OS/MVS, and CICS system software problems just *has* to be in here somewhere!

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- BIM-BLDINDEX - VSAM Alternate Index Build Utility NEW
- BIM-BUFF - DOS/VSE Dynamic VSAM Buffering
- BIMCMPRS - CICS 3270 Data Compression System NEW
- BIMCNSOL - Remote/Alternate Console and Console Message Redisplay
- BIMCNSOL/VTAM - VTAM Access to DOS/VSE Console
- BIM-COBOLMATE - Reformats standard COBOL output, reduces printed output 40%
- BIM-DOC - Display Operator Console
- BIMECHO - CICS Screen Duplication and Demonstration Facility
- BIM-EDIT/DOS - DOS/VSE On-line Program Editor System
- BIM-EDIT/OS - OS/MVS On-line Program Editor System
- BIM-FLEET - RJE File Transfer Utility
- BIM-FMAP - On-line CICS MAP Generation Facility
- BIM-ICCF - Access to CICS transactions from within ICCF
- BIM-JOURNAL - VSAM Batch Journaling
- BIM-JMASTER - Journal Archiving and Control
- BIM-LMON - VSE Phase Load Monitor
- BIMMONTR - DOS/VSE System Status, Performance, & POWER Queue Display
- BIM-ODIS - On-line CICS System Status Display
  - ODISTRAK - Optional feature used to record major CICS statistics
- BIM-PACK - Automatic DOS/VSE VSAM File Compression
- BIM-PADS - DOS/VSE POWER Alter-Delete System
- BIM-PRINT - Simple and complete control of remote printing and viewing
  - VMPRINT - Optional feature that provides VM Spool Queue Access
- BIMP3270 - CICS CRT Screen Print Facility
- BIM-QCOPY - Utility that copies/reformats reports from VM or POWER Spool Queue
- BIM-RECOV - CICS VSAM Recovery
- BIMSERV - DOS/VSE Library Display
- BIMSPLIT - Break Print Listings into Multiple Jobs
- BIMSPLSR - BIMSPOOL Laser Printer Support
- BIMSPOOL - DOS/VSE Batch to Terminal Printer Spooling
- BIMSPOON - DOS/VSE On-line to Batch Print Spooling
- BIMSUBMT - DOS/VSE On-line Job Submission
- BIMSWAP - BTAM Terminal Swap Facility
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EcoTools expanded

Sybase, Informix RDBMS capabilities added

By Jean S. Bozman

CUPERTINO, CALIF.

EcoSystems Software, Inc. is set to announce this week that it will broaden the reach of its six-month-old EcoTools systems administration tools to Sybase, Inc. and Informix Software, Inc. relational databases. Previously, the EcoTools package, which began shipping last fall, only worked with Oracle Corp. relational databases.

EcoTools Version 2.0 is due to ship by year's end, the 2-year-old firm said. The firm's EcoSphere systems management software deploys software "agents" to check Unix operating system parameters and database performance [CW, Oct. 19, 1992]. The resulting status reports about I/O, memory use and response time are displayed to database administrators on a central console. The EcoTools package allows users to tune database performance based on a snapshot of their computer system's efficiency.

The new EcoTools package now supports the Open Software Foundation's Motif graphical user interface (GUI), and the management console can be hosted by Sun Microsystems, Inc. workstations, IBM RISC System/6000s or Hewlett-Packard Co. HP/UX workstations. Previously, the same tool set ran only on Sun workstations under Sun's OpenLook GUI.

Version 2.0 will also have a job-scheduling module, said EcoSystems Marketing Vice President John Howorth. Pricing for EcoTools begins at $6,000 for an eight-user system; additional modules are priced at $2,000 each.

Rare birds

EcoSystems is one of a handful of vendors that combine systems administration with database administration. Computer Associates International, Inc. sells the UniCenter open systems management product, and two small newcomers include Patrol Software, Inc. in Redwood City, Calif., and Open Vision Technologies, Inc. in Pleasanton, Calif.

"Open systems are getting so complex that users don't have a choice," said Rikki Kirzner, principal analyst at Dataquest, Inc. in San Jose, Calif. "They've got to manage this stuff."

New Products

Application development tools

Cascade Technologies, Inc. has enhanced Cascade Voice Tools, its OS/2-based application generator for interactive voice-response systems to support the Btrieve file format.

Off-the-shelf access support is provided to dBase, Fox, Btrieve, Clipper, ASCII and Oracle Corp.'s SQL files. According to the company, the Btrieve support enables users to work with familiar Btrieve syntax. Btrieve query results are either directly spoken to the caller, utilized within conditionals and calculations or kept in variables.

Prices for Cascade Voice Tools range from $2,000 to $10,000.

▶ *Cascade Technologies*
1430 Broadway
New York, N.Y. 10018
(212) 768-7380

Set Laboratories, Inc. has introduced Version 4.0 of UX-Metric for C, a measurement and analysis package.

New metrics, reports and a variable cross-reference feature have been added to this version. UX-Metric was designed to assist users in allocating software review, testing resources and examining trends in the code as it evolves, the company said.

A single-user license costs $525.

▶ *Set Laboratories*
26976 S. Highway 213
Mulino, Ore. 97042
(503) 829-7123

National Information Systems, Inc. has announced Accent Sun Transition Pack (STP), an Xview and OpenLook Intrinsics Toolkit (OLIT)-to-Motif source code translator.

Accent STP was designed for users of Sun Microsystems, Inc. workstations who will need to support the Common Open Software Environment by converting their applications to the Open Software Foundation's Motif.

The product is said to translate 85% to 100% of the C application source code generated by Sun's DevGuide, OLIT and SunSoft's Xview where there are equivalent paradigms provided in Motif. Depending on the features used by the application, 100% of the source code can be converted, the company reported.

Accent STP costs $4,995 for the first node-locked user license on the network and $2,495 for each additional node-locked user license.

▶ *National Information Systems*
4040 Moorpark Ave.
San Jose, Calif. 95117
(408) 985-7100

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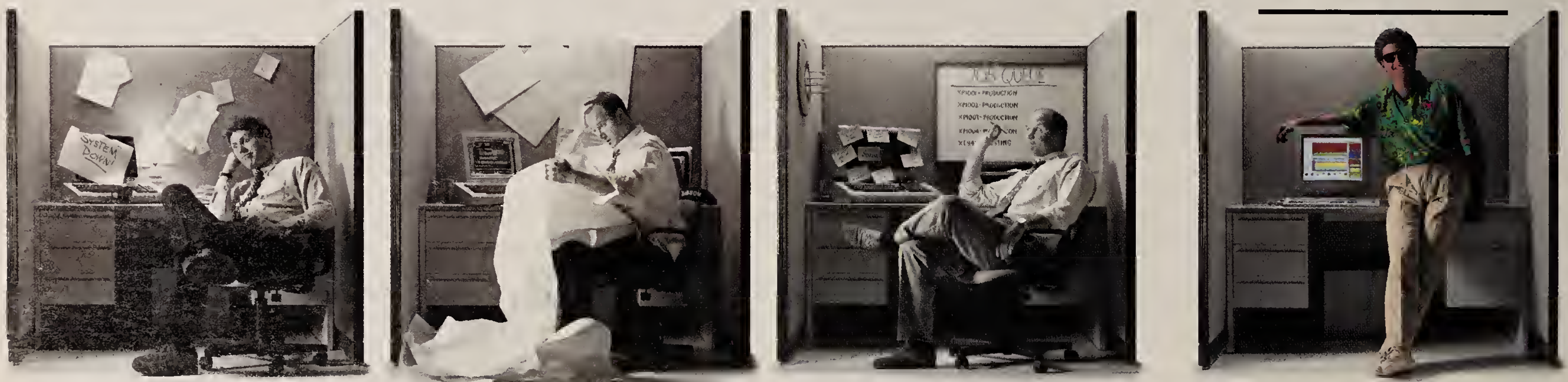

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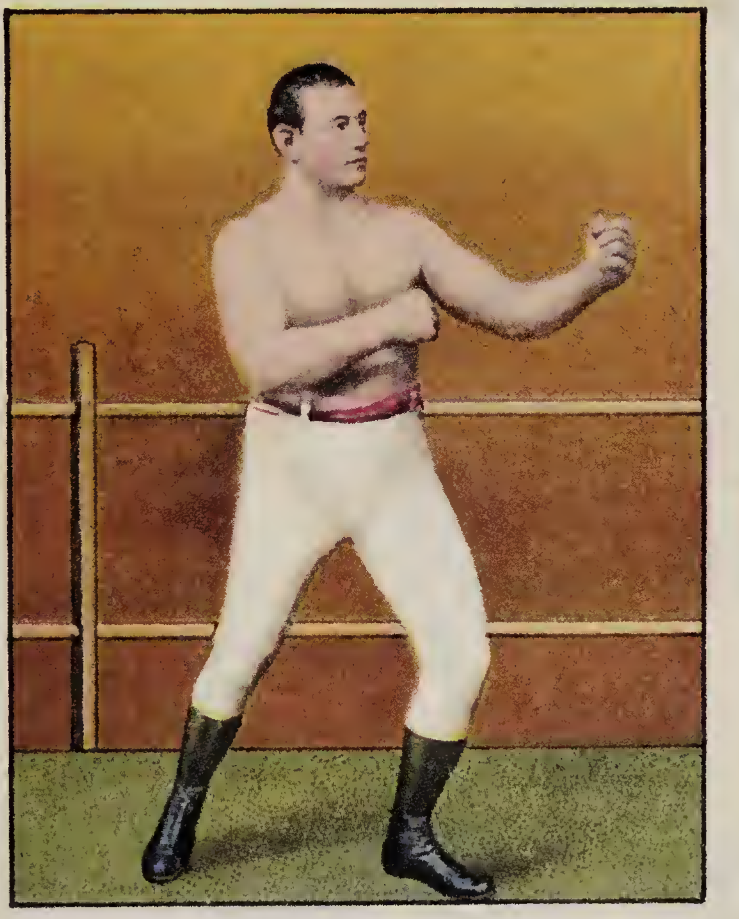

John L Sullivan
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Grow with the [information] flow

A crush of E-mail, on-line information services and mobile computers is forcing IS to find new ways to make data usable

CINDY CHARLES

▶ **California State Department of Insurance's Ron Kuhnel:** *'My office looks like a control center for NASA'*

By Jean S. Bozman

Information once flowed through fairly predictable channels: databases, departmental reports and accountants' spreadsheets. Such structured data could be easily indexed, retrieved or queried.

Now, a variety of alternate data pipelines — including electronic mail, mobile computers, groupware, voice mail and on-line information services — are making information systems managers' jobs more difficult by delivering new torrents of *unstructured* data to companies.

And some observers predict the surging data stream will only widen: Heavier traffic from portable office devices and high-bandwidth channels such as the Internet, Integrated Services Digital Network and multimedia are transmitting more real-time communications and video.

"We really are on the edge of tremendous change," says Arno Penzias, vice president of research at AT&T Bell Laboratories in Murray Hill, N.J., and a Nobel Prize laureate. According to Penzias, IS has a key but still unfulfilled role in the new information world.

"If everybody does their own thing, you lose all hope of corporate coherence," Penzias warns. While individuals need some amount of freedom, he says, "IS needs to add some value" in the form of uniform information exchange.

Too much information

Unfortunately, in many companies the ability to create unstructured data is far outstripping the ability to digest it. The result: IS groups increasingly find themselves in an awkward transitional phase in their role as corporate information custodians — and as professionals.

"I have information overload," says Ron Kuhnel, chief technologist at the California State Department of Insurance. "I have three phones on my desk, two computers and a pager. People joke that my office looks like a control center for NASA." Kuhnel carries a cellular telephone so he can receive calls outside the voice-mail system.

The basic technical problem is both simple and deceptively complex: It's almost impossible to prejudge the format of the data that comes from outside sources and arrives on the local-area network via modem. An outside source might be offered in ASCII characters, for example, which in-house systems might not support.

What's worse, there are few IS-managed communications pipelines that can easily link established systems with unstructured data obtained via PC from such emerging sources as commercial news services and stock-trading databases.

Plus, few software interfaces exist that can bridge the gap between in-house data formats and those used by outside data providers. And connecting voice mail and computer systems remains only a fond hope for at least the next three years.

Robert Theobald on coping with chaos. Page 109

It all adds up to one big, information-stuffed headache for end users and IS. Although many say they feel awash in undifferentiated data, IS managers are often unsure how — or even whether — to cope with the problem.

That's understandable: Most IS departments have their hands full maintaining existing systems while simultaneously tackling tough client/server and re-engineering projects. Often there's little time, money, energy or interest left for unstructured data.

As a result, attention to information overload issues in many companies is being deferred to

Information, *page 109*

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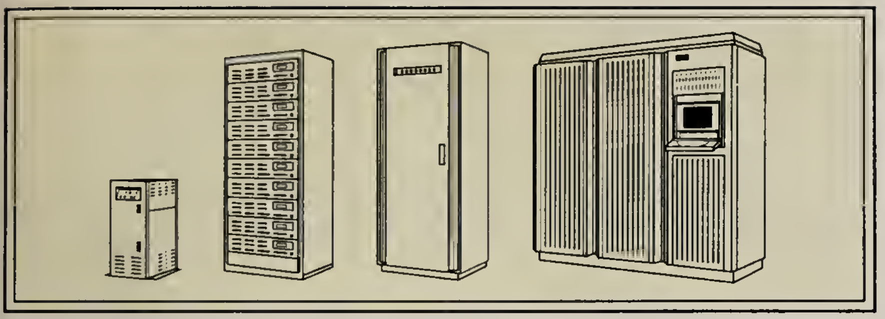

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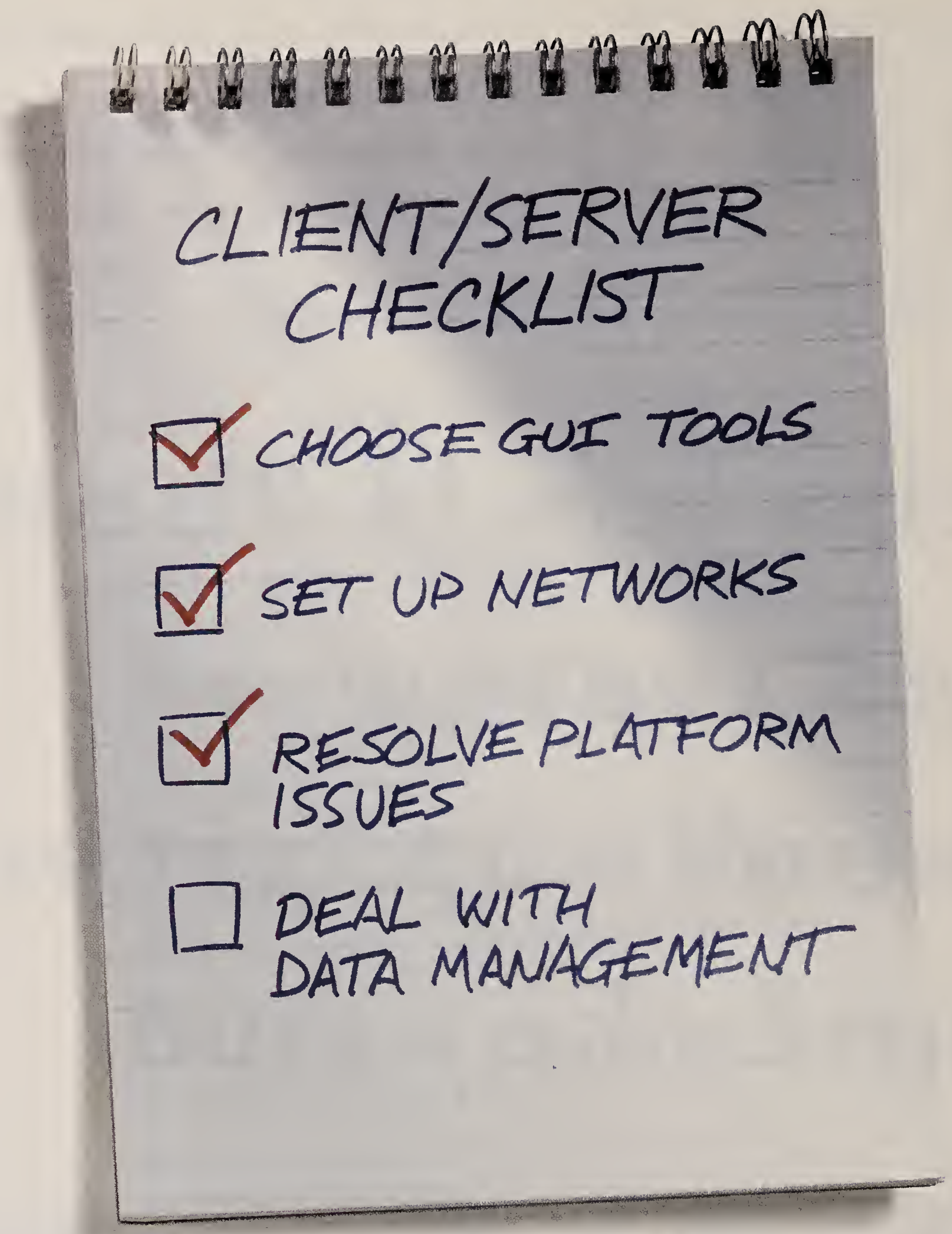

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As you move to client/server computing, you'll undoubtedly spend countless hours evaluating GUI tools, sorting through network solutions and resolving platform issues. But past experience will tell you that managing your data is just as important. In fact, it's key to delivering information to your users when and where they need it–and making sure it's the right information.

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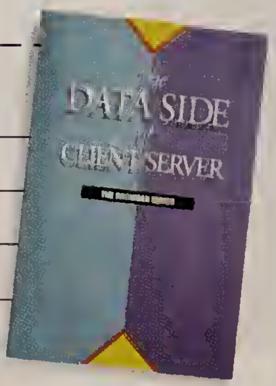
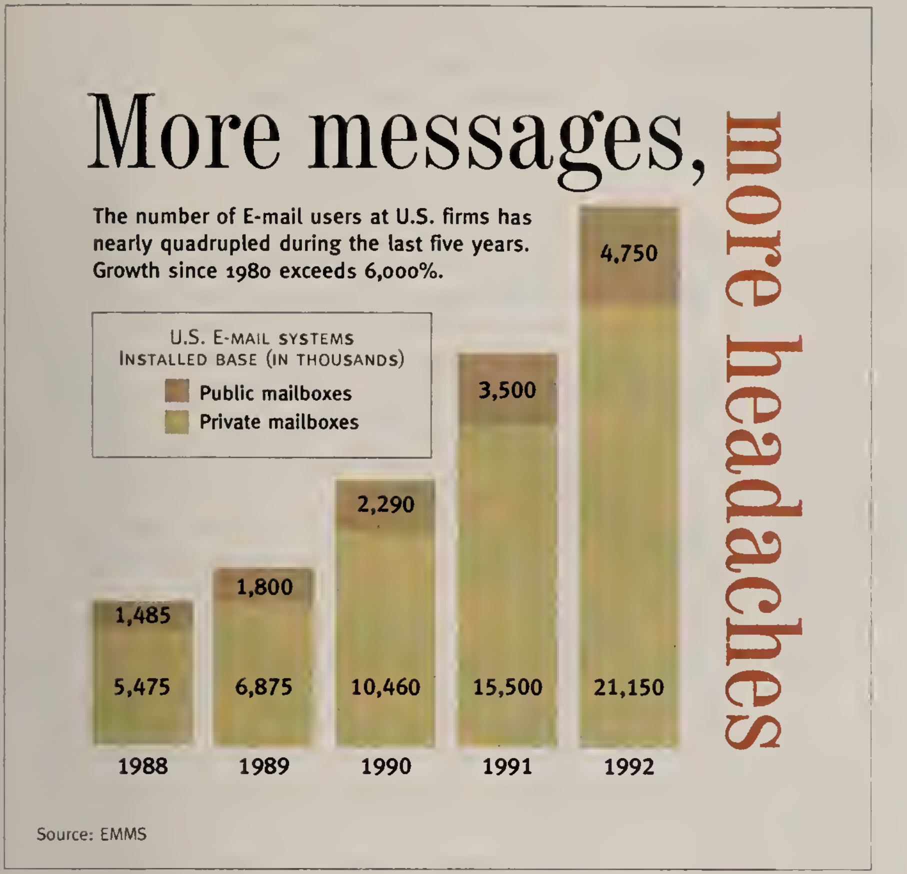




More messages, more headaches

The number of E-mail users at U.S. firms has nearly quadrupled during the last five years. Growth since 1980 exceeds 6,000%.

Source: EMMS

Information

CONTINUED FROM PAGE 105

user departments or put on hold until better technology comes along.

But some IS chiefs are already concluding that when it comes to information, less is better.

"Some people like to say that [IS] should provide users with as much information as possible," says Eric Firdman, executive director of strategic IS at Pacific Bell in San Ramon, Calif. "This is absolutely wrong. We should provide people with as little information as is necessary for them to get their jobs done."

That's a far cry from just a couple of years ago, when users scrambled to pipe as much data as possible into the organization.

Architecture called key

As IS managers begin the painful changeover to a world of open systems and unstructured data, most say the biggest task is learning ways to channel incoming data into predefined pipelines.

"Architecture is the single most important contribution of IS in an era of open systems," Penzias declares. "If the IS organization doesn't step up to its role of providing a corporate information architecture, what are they good for?" He and others note that if IS fails to handle the task, each division or department will do so, eventually leading to informational chaos.

IS managers and experts say a proven, universal method for handling information overload is still a long way off.

Until then, forward-looking organizations are exploring new ways to blend the old world of structured data with the new world of CD-ROM, multimedia and near-universal E-mail.

Among popular techniques: using electronic "filters" to identify selected topics and store related data files for future retrieval by end users. Such filters are already being used to trap incoming messages of interest from outside data services. Other IS managers are installing CD-ROM databases as network resources and systems.

Texaco Corp.'s Exploration Producing Technology department in Houston hires outside data vendors to sift through raw petroleum industry data before the data is uploaded to company computer systems.

Even though the process takes about a week, it's still a great time saver and productivity booster, according to Tom Peters, manager of data management.

Outside vendors "will sift it, massage it and get it into a common format." Large data tapes are then downloaded to several company facilities. But drawbacks remain, Peters says.

Texaco uses many types of computers, so data tapes must be adapted for on-line use with several systems. And, Peters adds, "somebody [here] has to look after it on a monthly basis."

Fortunately, internal data flows more freely at Texaco — thanks to the fact that 18 months ago the company's IS department linked nine separate E-mail systems.

"Before that, you had to log on to the individual systems," Peters recalls. Now, users can log on to their own computer system and automatically have access to E-mail in all Texaco systems, he says.

Texaco also designed a "virtual data server" based on Sybase, Inc.'s SQL Server to navigate through data stored in several databases, including IBM's DB2 and AT&T/NCR Corp.'s Teradata/Sharebase.

A Texaco IS team built a "seamless" access method that helps users find data dispersed over many computer systems — and to retrieve it for their own PC-based applications. The virtual data server in Houston has provided such a valuable window on diverse databases that Peters plans to place similar servers in other cities.

Hope in relational

Relational databases are emerging as an important stop-gap tool in the struggle to tame unstructured data, largely because these products can be queried through the use of industry-standard SQL commands.

IS managers say storing unstructured data in relational databases makes information easier to find and easier to capture for analysis.

That's the approach used to organize consumer protection information at the California Department of Insurance.

"An early-warning [insurance fraud] system allows every employee in the department to input free-form comment in the Oracle database," Kuhnel explains. "It's like a bulletin board."

In all, 1,000 users can log on to the insurance agency's system. The only downside, he says, is that the free-form comments are posted to the central database immediately and cannot be called back for revision later on.

Other IS managers prefer to keep their unstructured data separate from traditional systems.

Pacificorp, a Portland, Ore., power utility, has decided to make CD-ROM use a matter of personal choice that involves little support from the corporate IS staff. Users employ CD-ROMs hooked into the corporate network as sources of external data, such as newspaper articles.

Wayne Horscroft, manager of data management, says the arrangement frees IS from having to create or administer databases provided by outside vendors.

Pacificorp has also experimented with executive information systems (EIS) to capture key information for top executives. But Horscroft says the system required continuous changes and updates by the IS staff, and its use was often spotty.

The experience legitimizes a common fear that IS could get swamped if it tries to tame too much unstructured data. Some fear that users would be subjected to an "information backlog" as severe and frustrating as today's application development backlog.

While Horscroft says he's pleased with the advances so far, he says he sees room for more improvement, especially through

Information, *page 110*

RESOURCES

The following are some selected articles on effective information management:

- "Hat racks for understanding: Designing software to help users gain new understanding about information," *Communications of the ACM,* October 1992.
- "Soften up!: Usage of soft information in executive information systems," Hugh Watson, *Computerworld,* Oct. 19, 1992.
- "Query tools: Get information now!" *Data Based Advisor,* September 1992.
- "Postmodern information forms: U.S. businesses utilizing four categories of information," William Davidow, *Computerworld,* Oct. 5, 1992.
- "Index everything: The publicly developed wide-area information server is now being applied to corporate information," *MacWeek,* Oct. 26, 1992.
- "Nick Arnett on multimedia: Problems of searching for information," *Multimedia Business Report,* Oct. 22, 1992.

How to survive the data deluge

"Information at your fingertips" may make users feel empowered and could make Microsoft Corp. rich. But the armfuls of data that arrive with each day's E-mail may make some overwhelmed users feel like wrapping those same fingers around Bill Gates' neck.

That's understandable, says Robert Theobald, a consultant who has written several books on technology's impact, including *Turning the Century* and *The Rapids of Change,* published by Knowledge Systems, Inc. in Indianapolis.

"We're still hung up on the concept that information is wonderful," he says. "One hundred years ago, we didn't really have any [information]. Now we have too much."

And more, Theobald says, is not always better.

Instead of creating less work and stress, computers have actually increased stress by speeding up information flow and the pace of the workday, he maintains.

To survive the information glut, Theobald advocates keeping a strong human perspective and thinking small.

Instead of talking about "information superhighways," for example, he says IS managers should think in terms of electronic communities that are more like Main Street than Wall Street.

Such "communities," he explains, will be defined by an affinity of ideas rather than by geography. Users in this scenario dip into the river of data, leaving the rest of it for others to absorb.

"Each of us has to center on our core interests and decide which people we need to talk to," Theobald says. A new etiquette may even evolve, so callers will understand that a response to every voice mail or E-mail message is not mandatory.

—Jean S. Bozman

Info overloads, smart solutions

E-mail, voice mail, commercial information services and other sources are producing a flood of new unstructured data that's difficult for IS to handle

- **Texaco** uses a 'virtual data server' to navigate several different databases. The firm also employs outside vendors to sift industry data before it is sent to company computers.
- **The California State Department of Insurance** traps important consumer protection information on a centralized relational database. Some 1,000 users can add free-form comment.
- **Fidelity Investments** is linking corporate E-mail systems and employs electronic 'filters' to limit items collected from commercial information services.

Information

CONTINUED FROM PAGE 109

better data filtering.

"We've got a lot of data flowing through our organization, but no filtering is taking place," Horscroft says. "I'm beginning to wonder if the old idea of the information resource center should be changed into a group of expert information listeners."

In such a scenario, specialists would be appointed to look for outside data sources to support the work of each business unit.

Any hope?

By the late 1990s, visual material from CD-ROMs, videos — and even the nightly news — will be viewed from PCs and combined with text, voice and data.

Does IS have any prayer of lessening the mismatch between current communications technology and the growing size of the electronic "in" basket?

Hopes seem brightest for taming E-mail, primarily because it can be scanned and edited.

To this end, leading-edge companies, including Fidelity Investments in Boston, are working to link all their E-mail systems.

Bill Niemi, director of distributed systems at Fidelity, says the financial services firm is trying to train users to be part of the solution.

Fidelity has numerous Sybase SQL Server relational databases that IS monitors to ensure peak performance and reliability. The goal, explains Niemi, is to let users access these databases with PCs without slowing them down.

"The big thing you've got to be careful about is the runaway query," Niemi says. "You have to make the users aware they could impact response time for all users."

Apple Computer, Inc. and Microsoft Corp. are both working on devising industry standards, but results are still years away. Combined E-mail servers that support many kinds of client PCs may provide one answer .

Better interfaces between voice-mail services and PCs will help users quickly edit, annotate and share data.

Bell Laboratories now has 60 speech researchers working to translate voice mail into a readable and scannable E-mail interface. But Penzias says a speech-to-text interface won't be available until 1996.

Object-oriented technology may also offer a way to handle the mix of text, data, images and voice. But much object-oriented code must be written first so that data can have a safe haven.

Database makers Oracle Corp., The ASK Group, Inc.'s Ingres Products Division and others are devising ways to incorporate multimedia data into standard relational databases. But products are still a ways off.

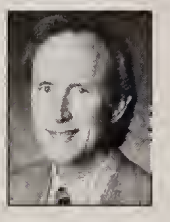
Some say it's crucial that IS continue to develop front-end systems that help end users manage the information flood by providing menus or "windows" to different data sources or by creating new forms of EIS.

More optimistic IS managers are bracing for a challenging and potentially rewarding task.

"You gain productivity by buckling together all these separate systems," Kuhnel says. "That's where the power is. There's a synergy involved in which the whole is greater than the sum of the parts." •

Executive Track

New York-based executive recruiting firm **Russell Reynolds Associates** has brought former **Price Waterhouse** consultant **Donald K. Jones** on board to help expand its technology practice. Jones, whose title at Russell Reynolds is executive director, will work out of the firm's Washington, D.C., office.



Former management consultant **Don Harder** has been appointed to the position of senior vice president of information technology at **EMI Records Group North America** in New York City.

During his 18 years with **Ernst & Young**'s Management Consulting Division, Harder — who had been a partner at the firm since 1982 — served as a consultant to Ernst & Young client EMI Records.

In his new capacity as EMI Records' top information systems executive, he will oversee development and implementation of technology and business systems for the company's North American operations.

Robert Woods, deputy assistant secretary for information resources management at the **Department of Veterans Affairs**, walked away with **FOSE**'s annual government award for outstanding demonstration of ability to manage, influence or shape the U.S. government systems arena. FOSE is among the nation's largest computer shows; candidates for its annual awards — one given to a person in government and one to an individual from private industry — are nominated by their peers.

Robert W. Rapp is the new vice president of IS at Dallas-based **Southwest Airlines.** Rapp, a 20-year IS industry veteran, formerly served as IS director at **Pacific Enterprises Oil Co.** (USA), which is also based in Dallas. He will be responsible for all of Southwest's computer and communications services.

Calendar

MAY 16-MAY 22

ICA ComNet Dallas '93. Dallas, May 16-20 — Contact: World Expo Corp., Framingham, Mass. (508) 879-6700.

Wireless DataComm '93 Exposition and Conference. San Jose, Calif., May 18-20 — Contact: Communications Events, Inc., Norwalk, Conn. (203) 847-5131.

Annual 1993 Midwest Computer Show. Rosemont, Ill., May 19-21 — Contact: Illinois CPA Society Foundation, Chicago, Ill. (312) 993-0393.

Virtual Reality Conference and Exhibition. San Jose, Calif., May 19-21 — Contact: Meckler Managing Information Technology, Westport, Conn. (203) 226-6967.

MAY 23-MAY 29

National Operations and Automation Conference. New Orleans, May 23-26 — Contact: American Bankers Association, Washington, D.C. (202) 663-5000.

International DB2 Users Group Conference. Dallas, May 23-27 — Contact: International DB2 Users Group, Chicago, Ill. (312) 527-6777.

Fuse '93 Educational Conference and International User Meeting. Atlanta, May 24-25 — Contact: Fuse, Inc., Manalapan, N.J. (908) 308-9277.

American Production Inventory Control Society 1993 Remanufacturing Seminar. Oklahoma City, May 24-26 — Contact: The Educational Society for Resource Management, Falls Church, Va. (703) 237-8344.

Midwest Electronics Expo. Minneapolis, May 24-27 — Contact: Midwest Electronics Expo, Dallas, Texas (214) 239-3060.

Trade Show and Symposium on Client/Server Technology. Regina, Saskatchewan, Canada, May 25-26 — Contact: Dawn Redmond & Associates Ltd., Regina, Saskatchewan, Canada (306) 781-7300.

NextWorld Expo '93. San Francisco, May 25-27 — Contact: Digital Equipment Corp., Andover, Mass. (508) 470-3870.

MAY 30-JUNE 5

Usatech '93. Caracas, Venezuela, June 1-5 — Contact: International Exhibitions, Inc., Houston, Texas (713) 529-1480.

Joint Application Design User Conference. Hershey, Pa. June 2-4 — Contact: Anthony Crawford and Associates, Oakville, Ontario (416) 845-3844.

Transforming the Organization: Integrating Business, People and Information Technology. Wellesley, Mass., June 2-4 — Contact: Babson College, Wellesley, Mass. (617) 239-4354.

JUNE 6-JUNE 12

Equipment Resources Planning Institute. Albuquerque, N.M., June 7-8 — Contact: Equipment Resources Planning Institute, Santa Monica, Calif. (310) 394-2997.

Xhibition '93. San Jose, Calif., June 7-11 — Contact: Ed Chuang, Integrated Computer Solutions, Inc., Cambridge, Mass. (617) 621-0060, Ext. 111.

Annual Personal Communications and Computing Show. Chicago, June 3-6 — Contact: Electronic Industries Association, Washington, D.C. (202) 457-8762.

Autodesk Expo '93. Anaheim, Calif., June 8-10 — Contact: AEC Systems, Inc., Newington, Conn. (203) 666-6097.

A/E/C/ Systems '93. Anaheim, Calif., June 8-10 — Contact: A/E/C/ Systems, Inc., Newington, Conn. (203) 666-1326.

First Government Help Desk and Computer Training Conference. Washington, D.C., June 8-11 — Contact: Ruder Finn, Inc., Cambridge, Mass. (617) 577-0007.

Retail Systems '93. Boston, June 9-11 — Contact: Candace Cutler, Retail Systems '93, Newton Highlands, Mass. (617) 527-4626.

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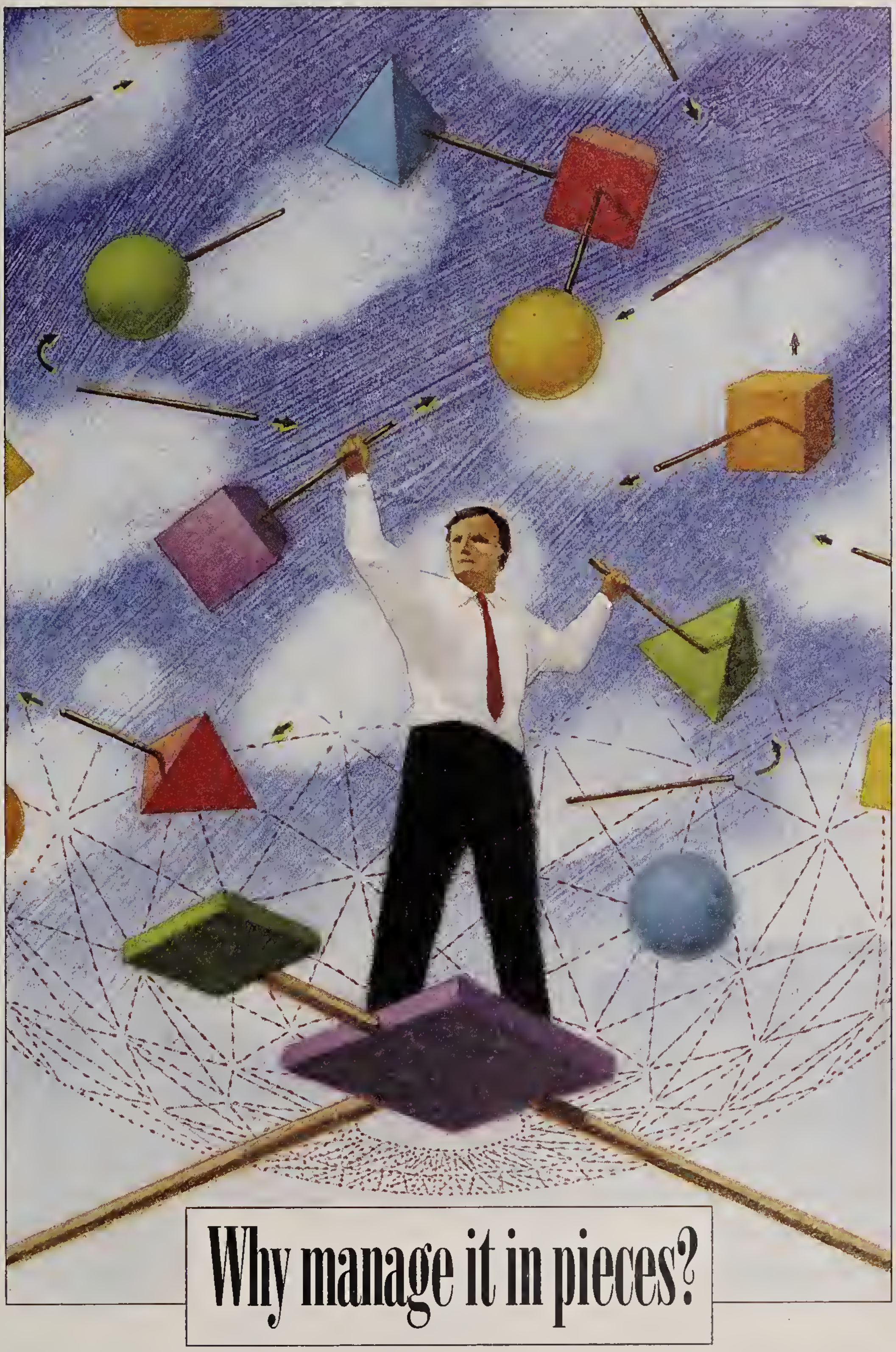

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APPLES AND ORANGUTANS

You can't just drop those legacy systems when client/server arrives. However, juggling the two presents new challenges and difficulties.

BY ROSEMARY CAFASSO

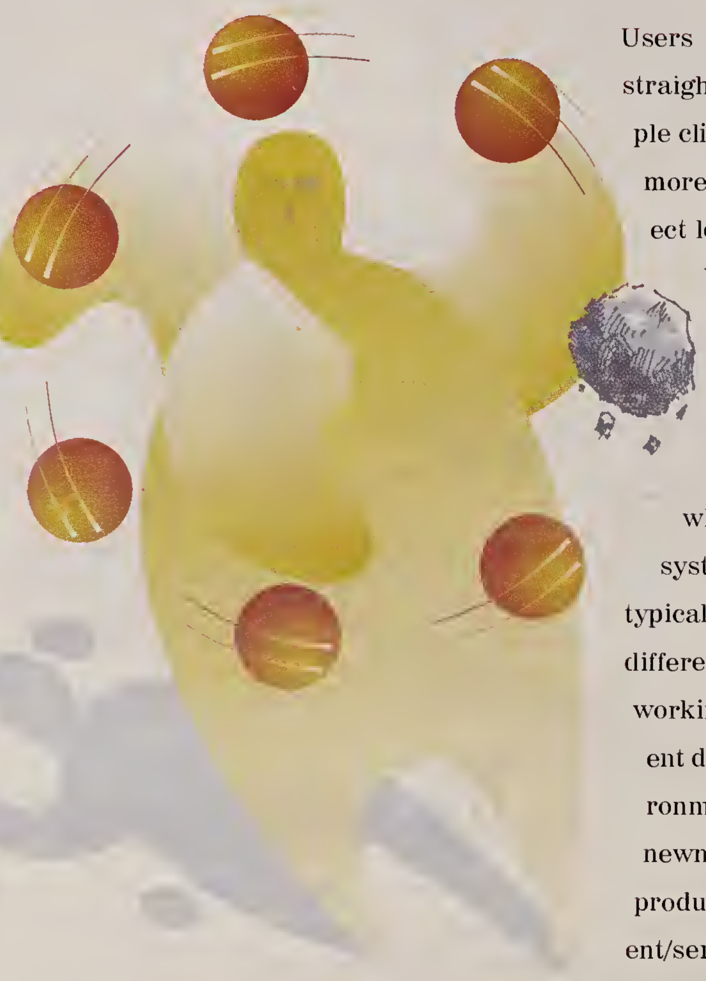
Companies that are embracing client/server technology as they build for the future are finding they need to think plenty about the past. In almost all cases, these companies are running host systems that represent several millions of dollars and a few decades of investment. Scrapping these "legacy" systems doesn't make sense because most of them still perform well and, more importantly, hold a lot of important corporate data.

The goal, then, is to figure out how to integrate client/server with existing systems. In some cases, companies are simultaneously plotting long-term migration strategies, but in others, companies such as Holiday Inn Worldwide Americas have already determined that client/server technology will supplement — but not supplant — the mainframe.

"We can see the possibilities of more extensive use of client/server," says David Peach, vice president of finance at Holiday Inn in Atlanta. "However, our vision is we also really need the power and size of our mainframe."

Whether a company envisions an eventual transition to total client/server or indefinite coexistence, integration strategy is critical because decisions made today are likely to live on for a very long time.

Those who have been there describe the process of integrating new client/server systems with legacy systems as slow and complex.



WHAT'S A LEGACY SYSTEM?

A legacy system is an application that was developed on older technology and is past its prime but is too critical to disrupt. What we now call legacy systems usually run on mainframes and minicomputers. Eventually, PC- and workstation-based systems will be 'handed down' to the legacy category as well.

Users and industry analysts say even relatively straightforward integration projects, such as a simple client/server query application, can easily take more than a year. As the complexity increases, project length stretches. Consolidated Edison of New York and Pacific Bell, for example, are both working on projects that are expected to take upward of five years (see stories pages 115 and 117).

The integration challenge can be overwhelming because it demands that information systems juggle so many different tasks that are typical of any integration project, including selecting different technologies, managing software and networking issues, pooling staff expertise from different disciplines and training users on the new environment. What makes these efforts unique is the newness of the client/server world. Many of the products and techniques required to integrate client/server software with legacy systems do not have much of a track record yet.

LEGACY SYSTEMS AND CLIENT/SERVER

Some brave souls are in the early stages of integrating production client/server applications with a host environment. This creates a real technological challenge — specifically, ensuring that corporate data shared among platforms stays in sync. Ed Acly, an analyst at Technology Investment Strategies Corp. in Framingham, Mass., says you could count the number of users integrating production environments "on your hands and feet."

But because of the tremendous challenges involved, most

Trane's Chip Lombardo *on just-in-time manufacturing: 'The dilemma is you need to plan more frequently'* ▶

REID HORN

companies are taking small steps and first working with decision-support client/server applications. In this case, users typically need access to mainframe data but do not require it in real time. As a result, IS can set up a system to download mainframe data to a server at set intervals, such as once a day. This is referred to as "staging" data.

For those who are integrating decision-support applications, techniques may vary. These typically include middleware, software vendor solutions, "homegrown" methods or a mix of these approaches (see story below).

Whatever the option, there are bound to be complications. The Centers for Disease Control and Prevention in Atlanta had some networking problems when doing a relatively straightforward client/server integration project. Kenneth Long, a systems analyst, says that by linking Software AG of North America, Inc.'s Adabas host database with a new set of server and PC products, users would have easier access to the data.

But "we were doing things a little differently [than a standard Software AG configuration], and we've had quite a bit of trouble," Long says.

IS departments often work with recently released or newly designed software that may not work just right. Or the integration may be set up perfectly but then you discover, as Trane Co. did, that the data transfer rate to move data between the old and the new system is horribly slow (see story at right). ■

DECISIONS, DECISIONS

Decision-support applications can be integrated in a number of ways, all of which have their ups and downs

Counting on middleware. Middleware serves as a layer that buffers the client/server application from the host world. It helps integrate a client/server application with a host environment by handling data access procedures so the application doesn't have to worry about it. This includes products such as Information Builders, Inc.'s EDA/SQL, which can provide users with connections to dozens of database management systems. The downside is these products typically aren't cheap. Depending on the complexity, a product can cost more than $100,000.

Relying on your software vendor. Application software providers such as The Dun & Bradstreet Corp. are rolling out client/server versions of their host systems that include a middleware layer or gateways to link the old with the new. Meanwhile, DBMS vendors such as IBM, Sybase, Inc., Computer Associates International, Inc. and Oracle Corp. are providing scaled-down client versions of their products, along with communications links. The downside: It typically confines a user to a single vendor's product.

The homegrown methods. Many users are opting to develop not only client/server applications but also data access tools themselves. The downside: This calls for a lot of trial and error.

The mixed bag. Some users pool a complex set of vendor tools, client/server applications and in-house-designed applications. The downside: It can be a nightmare to coordinate and track all the pieces involved. ■

Communication the heart of just-in-time manufacturing

BY ROSEMARY CAFASSO

At Trane Co., a maker of residential and light commercial air-conditioning units in Tyler, Texas, marrying a client/server Unix-based application with a host-based manufacturing system has produced a quantum improvement in customer responsiveness and planning efficiency.

For example, when Hurricane Andrew hit the Miami area last year, causing many businesses to scramble for fast delivery of new air-conditioning units, the company was able to confirm deliveries within hours instead of the usual day or more.

Fresh manufacturing data from Andersen Consulting's host-based MAC-PAC application is also now available continuously, rather than once a week, after a weekend batch run. Workers can run analyses on mainframe data by downloading it to a new client/server system the company dubbed Lightspeed, based on Carp Systems Internationa's Advanced Planning System.

CASE STUDY

These performance gains were hard won. Getting the pieces to work together required painstaking effort.

Trane had been running MAC-PAC, which handles inventory and customer information. While the company wanted the mainframe-class performance, security and reliability, it also wanted a system that was more on-line and flexible.

"We were moving to just-in-time manufacturing," says Chip Lombardo, manager of information systems at Trane's Unitary Products Division. "The dilemma is you need to plan more frequently. You are looking at smaller production runs but doing them more frequently. That taxes a traditional MRP system."

Last year, Trane contracted with Carp for an IBM RISC System/6000-based client/server planning package that the vendor tailored to mimic the mainframe MAC-PAC system. As a result, the impact on users was minimal.

But Lightspeed was missing one key piece: the MAC-PAC data. The mainframe's role in managing data was considered too crucial to change.

When Lightspeed was first installed last year, it was unusable because the communications link between the new software and the host system was too slow.

Initially, the team downloaded data from the host via a T1 line to the Tyler facility. It went to a PC-based communications server and was then routed to the RS/6000. With this configuration, Trane received about 30M bytes of data on an hourly basis, Lombardo says.

Not satisfied with this performance, the team installed IBM's Host Connection Program on the RS/6000 and then routed data directly to the server.

Results were better after that but still not all the company wanted, so the team began to tackle every possible element. Data packet sizes and buffers were adjusted.

Today, after what Lombardo calls "a very arduous process," Trane is now moving an average of 60M bytes of mainframe data to the server per hour. Later this year, Trane will tackle another big communications issue: getting data back up to the host easily. Currently, users are working with extracts of production data. ■

TRANE CO.

TASK: To update manufacturing system by integrating a client/server front-end application to the host.

PURPOSE: To develop a more flexible manufacturing operation that can respond more quickly to market changes.

PAYBACK: Turnaround on manufacturing planning processes reduced from two weeks to a few days. Mainframe batch jobs replaced by quick daily analysis on new system.

The 5th Wave
By Rich Tennant
RICHTENNANT
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From old to new with just a ‘click’

BY ROSEMARY CAFASSO

Dec Bitterman, a maintenance administrator at Pacific Bell in San Ramon, Calif., remembers well what it was like troubleshooting a customer account just a few months ago. It wasn't unusual for her to access several different host-based systems; with each one, she was required to provide a separate log-on and password.

“You had to remember all of them, and that can be impossible,” she says.

Recently, Bitterman worked with a prototype client/server data retrieval system designed as a front end to several of the company's older applications, including IBM host-based and Digital Equipment Corp. Unix-based programs.

Two Sun Microsystems, Inc. SPARCserver 670s run in-house-designed and licensed software that handles the navigation through the legacy systems, as well as the networking mechanics of transmitting messages through the systems. At the front end, users work with Microsoft Corp. Windows-based PCs, which provide a user-friendly view of the data.

Now, Bitterman clicks on menu selections and options lists to move through the legacy environment and is able to devote more time to “what I want to do.”

▲ **Pacific Bell's Jennifer Lamarre** *found ways to gain the benefits of client/server without sacrificing the conveniences of legacy systems*

CINDY CHARLES

Old dog, new tricks

This new system is part of a several-year project under way at Pac Bell to make its old systems more usable.

Along with a planning committee, Jennifer Lamarre, director of the strategic systems interconnection district, devoted nearly two years on the front end of the process to determine how to gain the benefits of client/server without sacrificing the legacy systems.

From the field, the project team learned that users liked the performance of the older systems. The problem, however, was that they were rigid and difficult to use.

“They had started to organize around the systems instead of around supporting customer needs,” Lamarre says.

The team's decision: Create a layer of software based on a client/server model that would “surround” the older systems. The client/server front end handles communications and data retrieval processing as well as providing the graphical front end.

PACIFIC BELL

TASK: To redesign the legacy environment to make it easier to use.

PURPOSE: To improve communications and data retrieval while maintaining old system.

PAYBACK: Users are able to easily retrieve data from a number of host systems instead of accessing each mainframe program individually through cryptic commands.

To achieve this, Pac Bell acquired some software tools and kept the design of the front-end system in-house. The company is using Template Software, Inc.'s Snap, a fourth-generation language expert system shell, as well as Borland International, Inc.'s C++. A key piece comes from Apertus Technologies' Enterprise/Access, a middleware product that handles the programming interfaces to link the front layer to the legacy systems more easily.

On the user end, a maintenance administrator such as Bitterman no longer works with the legacy application. Instead, she works with a graphical front end and selects options. Behind the scenes, her requests are moved to the first Sun server, a navigation plan is established and the second server performs the actual retrieval. The data is then downloaded and presented on the PC.

But because the Pac Bell system is working with many legacy systems — it could eventually be 19 — this ease of use is coming at a price, Lamarre says. The big challenge with this system is configuration management. If a change such as a maintenance update is made in a legacy application, it could affect the new client/server front end.

“We have to deal with multiple systems and potentially multiple versions,” Lamarre says. “We are now spending a lot of time developing a change management database. “If the legacy tells us about changes, then we can schedule things in advance.”

Lamarre says the project has put the development team on the “forefront of technology” because much of this software was so recently put together.

“There are a lot of things that aren't definite,” such as the type of graphical user interface and middleware, she says. “We are making decisions that we feel are good ones, but it can feel like a risk.”

CASE STUDY

At Pac Bell, as at other companies, networking decisions are core to making a project like this successful, Lamarre says. The team is implementing a Transmission Control Protocol/Internet Protocol network to gain better performance and get more flexibility because it is based on industry standards. “That required a whole migration,” Lamarre says. The legacy environment had been using an older network based on Xerox Network Systems' protocol, originally made by Ungermann-Bass, Inc.

A production version of the system was recently rolled out to 100 users in the company's Sacramento, Calif., office. It will potentially be available for 5,000 users.

Lamarre says she expects the new software to be part of Pac Bell for a long time. “It will change a lot, though, because the way we built it is very modular. Theoretically, the user layer could stay there forever. The core architecture doesn't have to change.” ■

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Consolidated: Miles to go before it rests

Reinhold Spiegler

Consolidated Edison's Ed Glister *claims people and coordination issues can be more challenging than technical areas*

BY ROSEMARY CAFASSO

In 1998, Consolidated Edison of New York expects to be running a client/server-based customer information system that handles account management, inquiries and conflict resolution. But the company has a lot of miles to travel before it reaches that goal.

The utility decided in 1991 that it was time to replace its 21-year-old IBM host-based customer information system. The decision coincided with a corporate directive to move to a client/server model where appropriate, and the customer information system was a prime candidate. While the back-end data engine was still performing well, the front end was so unfriendly that it was impeding user efficiency.

CONSOLIDATED EDISON

TASK: To blend client/server features with 21-year-old customer service system. Gradually move to full client/server architecture.

PURPOSE: To boost customer service, deliver better and more consistent information to its 3 million customer accounts.

PAYBACK: Improved response time, customer relations and employee satisfaction.

Switching to a new application would have been too expensive to design in-house, and there was nothing on the market geared toward a utility operation, says Ed Glister, senior project manager.

So the design team came up with a two-phase plan that was officially put into place in December 1991. The first phase, currently under way, combines PC initiation with a gradual shift to client/server. While users are taking delivery of PCs and adjusting to off-the-shelf desktop applications, development efforts are concentrating on client/server enhancements to key host applications and creation of client/server applications. Also, graphical user interfaces are being built for host applications with Easel Corp.'s front-end design tools. Ground-up application development is concentrating on new client/server applications such as an automated work-flow program, a cash processing program and an ad-hoc query and analysis program.

Glister estimates Phase 1 will cost $25 million when the new hardware, software, development and training is rolled in. Phase 2, scheduled for completion in five years, will create a new back-end client/server-based database system.

While this two-phase plan is more practical and less traumatic than immediate wholesale replacement, it also presents some unique challenges. For example, Glister says taking this phased approach means devising methods to bridge new and old systems for the next several years — a potential integration nightmare.

"There's integrating technologies, then there's integrating technology with people and then there's integrating technologies with processes," Glister says. "These issues are constantly confronting us."

No easy task

Phase 1 is a whopper to manage because it has so many components. The company designed a client/server architecture for each of its 20 sites and includes PC workstations and three Compaq Computer Corp. 486-based servers. The servers handle communications between the user workstation and the host, new client/server applications and management of data files that are either established locally or downloaded from the mainframe.

Some programs did not require immediate replacement but did need fine-tuning to fit better with the client/server environment. In the case of a customer letter program, the company used Easel to design graphical front ends and more efficient data-retrieval mechanisms. These programs function like terminal-based applications but boost user productivity, Glister says. The query can now pool data from several mainframe files and present it in a single package to the user.

From the workstations, data requests are dispatched to the server and sent to the mainframe via a Digital Communications Associates, Inc. Select gateway.

Cash processing was one application in need of replacement with client/server. Previously, clerks at local offices could not access account histories stored on the mainframe. Consolidated Edison licensed an automated cash processing system from Systems Innovations, Inc. (recently acquired by Uniquest in Jacksonville, Fla.) and enhanced it. The software is now accessed via PCs and gives clerks immediate access to account histories.

The firm also identified important functions for which applications did not exist. Local ad-hoc query was one of the functions given high priority, so the project team built a program based on Gupta Corp. software. It includes a gateway that pulls data from IBM's DB2 on the host, stages it on the server and then lets users access it from PCs.

Not all the new applications have been developed in-house. For automated work flow, the utility licensed a program from Sigma Imaging Systems, Inc. that resides on the server and uses PCs as its front end. It accesses local data as well as data staged on a server that has been downloaded from the mainframe via the gateway.

CASE STUDY

Though some of the technical work has been difficult, Glister says, coordination chores and dealing with people issues are probably the biggest challenges.

Yet he considers himself lucky: Executive commitment remains strong, the effort is well financed and users have played an active role from the start.

"In a lot of ways, we've reduced the frustration levels," Glister adds. "Obviously, there's a frustration if you make a mistake. But most of the time, if we take two steps forward, we only take a small step backward." ■

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Benefits outweigh the costs

The move to client/server raises many questions for information systems managers. Consultant Herb Edelstein answers some questions frequently asked by clients interested in integrating legacy systems and client/server.

Q&A

Q. How much money will I save by converting to client/server?

A. You will save little, if anything, from the move to client/server itself. Real savings are available from using modern hardware that reflects today's cost structures, but those savings can be achieved by low-cost centralized multiuser systems. Most of the stories about cost savings compare an old, high-cost application with a modern implementation and count as savings, costs that have been shifted.

For example, the savings on cutting central IS personnel are counted, but the costs of adding departmental technical people are ignored. The costs of administering multiple, interconnected local-area networks, the integration problems of bringing together heterogeneous hardware and software and the difficulty of debugging and maintaining the mix may make client/server computing more expensive than some alternatives.

Q. If I'm not going to save money and I'm going to have all this grief in addition, why go to all the bother?

A. Remember, many companies are successfully migrating to client/server computing and reaping the benefits. Most applications do benefit from a client/server architecture.

There are two main reasons for moving to client/server. The first reason is that the benefits ultimately outweigh the costs. These benefits include a better user orientation with graphical user interfaces; scalability of applications with the addition of clients, servers and new LANs; and flexibility to meet a distributed, dynamic business environment.

The second reason is that computer vendors — both hardware and software — aren't going to give you much choice. They are putting the bulk of their research and development efforts into enterprise computing solutions based on networks, cooperative processing and client/server architectures. The older technologies are just going to fall further behind for lack of vendor attention and user demand.

Q. What tools should I use to query my legacy database?

A. You probably shouldn't run queries against it at all. Most likely, neither the database management system nor the database schema was designed to efficiently support ad-hoc queries. Even a moderate query load will probably bring performance to its knees and hurt operational applications. Rather, you should create query subsets that are downloaded to local servers and used with appropriate front-end tools.

While a large number of tools for connecting to legacy systems have been released, such as Information Builders, Inc.'s EDA/SQL and Sybase, Inc.'s Open Server, users are increasingly moving to replicated data strategies.

This year a wave of tools and announcements from companies such as Sybase (Replication Server) and Oracle Corp. (Snapshots and replication functions) have joined up with products such as Micro Decisionware Database Gateway's Transfer function, Digital Equipment Corp.'s Data Distributor and Channel Computing, Inc.'s InfoPump.

Q. What do I do with legacy data when I'm converting to client/server?

A. Unfortunately, it is virtually impossible to get rid of legacy data because it usually is filling the needs of certain users who will not allow it to go away.

You can't simply convert it to a new client/server system. Legacy systems typically have grown well beyond their original design goals as succeeding generations of users have added new requirements.

Furthermore, data is commonly extracted from legacy systems and stored redundantly for use by other legacy systems, so that eliminating one can have a serious ripple effect and expand the size of the conversion significantly.

You should migrate portions of your legacy systems to new architectures in a way that will help you meet your current business requirements. This means developing new systems for which the existing systems are a major input. It may also be best to re-engineer business processes as part of the effort.

While this migration is going on, the legacy system is maintained but not enhanced. You will have to decide which system is the source of updates. Depending on the application, transaction updates may continue to be done on the legacy system for some time, with extracts of data to client/server systems. Over time, the client/server system will become the live transaction system, and the legacy system will become an appendage updated through extracts.

However, keep in mind that as more users are off-loaded from the legacy system, the charges per user to do this will increase. ■

Edelstein is a principal at Euclid Associates, a Potomac, Md.-based consulting firm specializing in database management, client/server and document image management.

TAKING RISKS

OBSTACLE COURSE

Client/server computing is a lot more flexible than mainframe computing, which means there's a lot more room for problems. Be aware of potential difficulties in the following areas:

Security: Backups can create problems. When the database exists on multiple servers, each of which is subject to a different backup regimen, you can centralize the servers where they can be controlled by systems administration staff.

Subsystem interfaces: There are more interfaces from the desktop client over the LAN to a communications server and over a WAN to a remote server and back again. Each component has its own problems and requires its own expertise. Virtually no one is an expert in all client/server applications (LANs, WANs, internetworking, DBMS, GUIs, PCs, mainframes, multiple operating systems, etc.). Each interface introduces new problems, and with a lack of end-to-end debugging tools, it is difficult to find the problem source.

Applications: These need to be partitioned in a client/server architecture: Part of the application runs on the client, part on the server. You need to carefully think about what this split of application should be. The answer will depend on the application semantics and the client/server tools (for example, whether stored procedures are supported).

Data administration: You must ensure that data names, validations and business rules are uniform across different databases.

Scalability: If a database application overwhelms an existing server, you should be able to move to a larger server.

GUIs: These help in terms of ease of use. However, many programmers lack training and experience in designing GUIs, and as a result, GUIs often look good but have an unusable interface.

But despite these potential obstacles, the benefits of client/server computing are worth the effort. ■

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Commentary

Richard Finkelstein

Don't forget support

In the rush to replace mainframes with client/server systems, application support issues are being overlooked or ignored. For example, take the time-honored method for debugging problems: controlled replication of problems and gradual isolation. When the offending program code is located, it is then fixed.

Client/server environments are so complex, it is almost impossible to replicate and isolate problems in a controlled sequence. Errors caused by any combination of hardware and software components can occur on any of the client PCs, on the network and on the server. Tracking down the offending program code is tricky. It requires perseverance and often a good amount of luck. Problem resolution time is unpredictable, which means organizations are exposed to repeated downtime without any recourse.

Even if the offending program(s) is ferreted out, there is still the problem of getting the code fixed. A typical client/server environment comprises a myriad of components, all of which come from different vendors. Memory chips, BIOSs, control cards, network cards, disk drives, operating systems, network operating systems, etc., are only loosely integrated. If two or more vendors are involved, finger-pointing begins. It is almost impossible to pinpoint responsibility for the program. Meanwhile, the application languishes.

LEGACY SYSTEMS AND CLIENT/ SERVER

Watch your steps

If any of these situations sound familiar or possible in your company, the risks can be minimized. Here are some tips:

- **Carefully choose applications.** Applications that are read-only, such as decision support and executive information systems, are less prone to severe problems and less affected by unpredictable problem resolution time frames.
- **Limit the number of vendors that participate in a client/server environment.** Mainframe and minicomputer hardware and operating systems are highly homogeneous, making these platforms and their associated legacy systems supportable. By mimicking this proven tactic, users can make client/server environments more supportable. Products that are highly integrated by relatively few vendors (or just one) are easier to test, deploy and maintain. When problems do occur, it is easier to assign responsibility for fixes.
- **Choose products with solid references and a proven track record.** This rule of thumb is especially important when you're linking legacy and client/server systems. Most client/server products have a short history and limited production use. By selecting more mature products (which is almost an oxymoron when it comes to the client/server industry), users can expect that at least some of the more common problems have already been discovered and fixed and that other users can assist when unexpected problems arise.
- **Attend local user groups or check bulletin board services.** This is where you can check with other users to find out which products have proven track records and to find out about hidden problems.

The move toward client/server processing is inevitable because there are numerous benefits. However, the road is laden with bombshells, and organizations should do what they can do avoid them. Not only is problem resolution in heterogeneous environments expensive and resource-consuming, but it also has the potential to delay or abort major client/server efforts. Plan for the unexpected, and be prepared for the problems that will inevitably occur. ■

Finkelstein is president of Performance Computing, Inc. in Chicago.

Front-end tools

A new face for tired apps

By David Baum

Companies with substantial investments in mainframes and host-based systems are having the most difficulty making the jump to client/server computing, but a number of vendors of front-end development tools are reaching out to lend a hand.

These vendors are offering re-engineering, but re-engineering on a realistic scale: a way to update just the interface of aging legacy applications without tampering with the underlying code. Such tools allow developers to create sexy graphical user interface (GUI) front ends to run on PCs, complete with dialog boxes, pull-down and pop-up menus, scrolling bars and other graphic devices. The PCs replace dumb terminals as the user link to the mainframe.

Purists of client/server point out that such development doesn't really lead to client/server at all but simply provides a face-lift for a sagging system. But for some, the improvement is worth the effort and is a step in the right direction.

However, despite the user appeal of front-end integration, it is more a migration plan than a long-term solution.

"It's not a permanent solution but the initial stage in a migration to client/server. It's not necessarily rational, but it's defensive," says John Rymer, an analyst at the Patricia Seybold Group in Boston.

Defense is, in fact, one of the best arguments for starting client/server at the front end. Ease of use and flexibility are important, but many companies are very concerned about security in client/server environments. Because all data and processing remain on the host with this approach, there is less chance of data loss than with true client/server architectures.

Not a wasted effort

Another advantage is that an investment in this type of development is not necessarily wasted if and when a company decides it wants full-fledged client/server. Some frontware vendors, such as Easel Corp. and Gupta Corp., have added the capability to access SQL servers, enabling an eventual migration to PC-based applications using the same development tools.

But not every host-based system can benefit from the addition of a GUI. "For intensive, heads-down data entry, a GUI wouldn't really make sense," notes Judith Hurwitz, president of the Hurwitz Consulting Group in Newton, Mass. "It would probably slow the operators down. But if data entry clerks are moving between five or six different screens, then a well-designed GUI makes good sense."

For example, at Napa County's Department of Health and Human Services in Napa, Calif., a Unisys Corp. 2200 mainframe was implemented to run a cumbersome welfare application. It monitors a host of continually changing regulations while determining welfare eligibility, computing welfare benefits and handling reporting and a number of related administrative functions.

But the system was very difficult to learn and use, prompting Terry Longoria, deputy director at the site, to investigate the Designer Workbench, a Unisys product that can be used to build graphical front ends for Unisys mainframe applications. With the help of Deloitte & Touche, a consulting firm with an office in Napa, she created an interface that automatically navigates users from screen to screen, reduces keystrokes and handles some data validation.

Longoria says she isn't convinced that the GUI running will simplify the application or that the cost of the PCs will be repaid in productivity, but she still thinks the change was worth the effort.

The reason? "A lot of it has to do with staying current with modern technology," she says. "People in the outside world have become accustomed to GUIs. Adding a similar interface puts us in line with the strategic direction of the industry." ■

Baum is a free-lance writer based in Santa Barbara, Calif.

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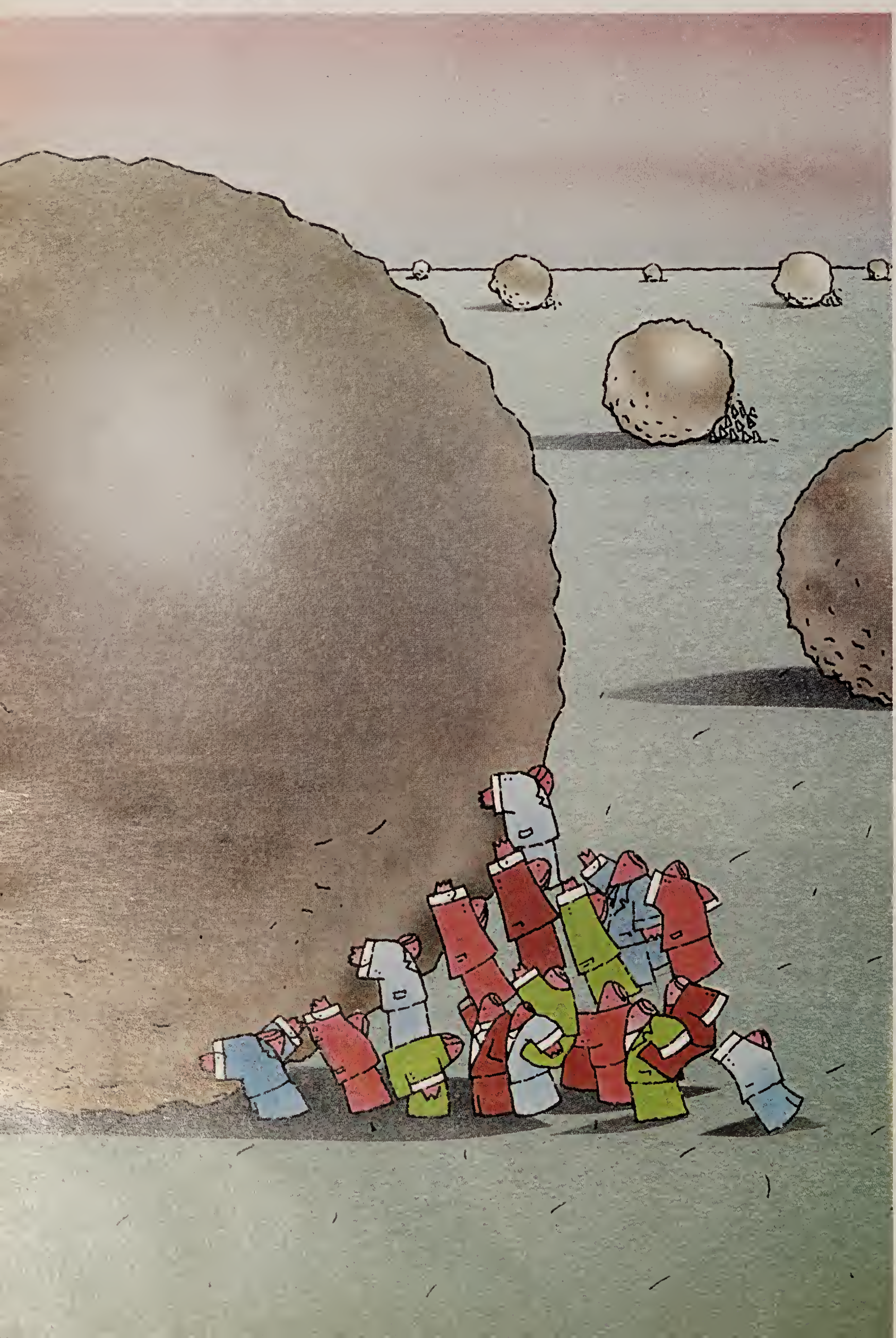

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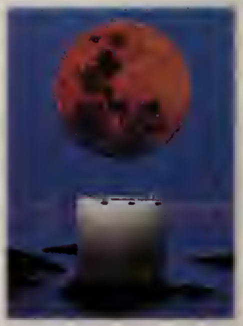

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The real power of technology is not that it can make old processes work better but that it lets you destroy outdated assumptions and create new ways of working — that is, **RE-ENGINEER**

EXPLOSIVE THINKING

By Michael Hammer and James Champy

A company that cannot change the way it thinks about information technology cannot re-engineer. A company that equates technology with automation cannot re-engineer. A company that looks for problems first and then seeks technology solutions cannot re-engineer.

Information technology plays a crucial role in business re-engineering but one that is easily miscast. Modern, state-of-the-art information technology is part of any re-engineering effort as an *essential enabler* because it *permits* companies to re-engineer business processes.

But, to paraphrase what is often said about money and government, merely throwing computers at an existing business problem does not cause it to be re-engineered. In fact, the *misuse* of technology can block re-engineering altogether by reinforcing old ways of thinking and old behavior patterns.

Learning to think inductively

To recognize the power inherent in modern information technology and to visualize its applications requires that companies use a form of thinking that businesspeople usually don't learn and with which they may feel uncomfortable. Most executives and managers know how to think *deductively*. That is, they are good at defining a problem or problems, then seeking and evaluating different solutions to it. But applying information technology to business re-engineering demands *inductive* thinking — the ability to first recognize a powerful solution and then seek the problems it might solve, problems the company probably doesn't even know it has.

The fundamental error most companies commit when they look at technology is to view it through the lens of their existing processes. Instead, they should ask, "How can we use technology to allow us to do things we are not already doing?"

Needs, as well as aspirations, are shaped by people's understanding of what is possible. Breakthrough technology makes feasible activities and actions of which people have not yet dreamed. The challenge that most corporations fail to meet is recognizing the business possibilities that lie latent in technology. This shortcoming is understandable if not excusable.

Take, for instance, teleconferencing. Initially, most organizations saw its value as a means of reducing travel costs: People would be able to meet without having to fly.

In this respect, teleconferencing has, by and large, proved a monumental failure. People travel to be with other people for many reasons. A trip, by its very undertaking, says something about the importance attached to the message ultimately delivered, of the subject eventually discussed. The nonverbal communication that takes place in a face-to-face meeting is probably more important than most of the words actually spoken. No surprise, then, that teleconferencing has had little effect on corporate travel costs.

That doesn't mean, however, that teleconferencing is without value. It means that its worth lies in transforming how work is done, not in lowering its costs.

For instance, one company we know has used teleconferencing to cut its product development cycle by six months. How?

This company's engineering and marketing staffs are based in two different states, so once a month one group would fly to the other's location and, face to face, they would iron out their problems. Now the company has installed teleconferencing facilities, but the engineers and marketers still fly to see one another once a month because they have found it difficult to resolve all their differences over television.

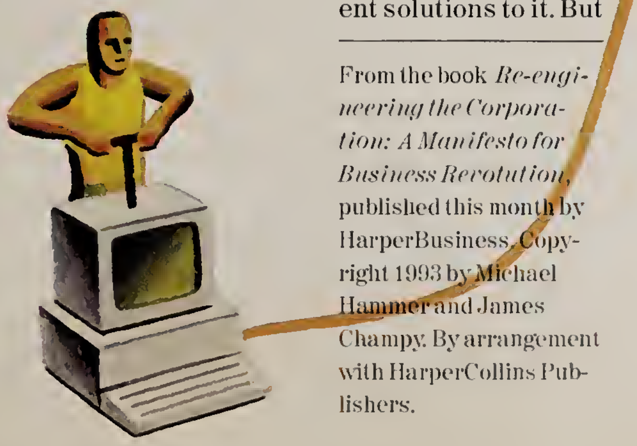
However, the engineers and marketers do use teleconferencing for weekly discussion sessions, which they previously could not hold because of the inconvenience, lost time and costs associated with travel.

With teleconferencing, everyone can "meet" once a week, stay informed and have their routine questions answered. As a result, product developers and marketers keep in better touch, problems get resolved earlier and faster, fewer trips get taken down blind alleys, projects are completed faster, and the products they produce are better suited to their markets.

In short, the value of teleconferencing to this

Explosive thinking, *page 125*

JAMES STEINBERG



From the book *Re-engineering the Corporation: A Manifesto for Business Revolution*, published this month by HarperBusiness. Copyright 1993 by Michael Hammer and James Champy. By arrangement with HarperCollins Publishers.

TARGET PRACTICE

For technology to be meaningful to a re-engineering effort, you have to ask the right question:

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Re-engineering

CONTINUED FROM PAGE 123

company is in allowing it to do something it had not done before: Keep marketers and designers in weekly contact. This use had not occurred to the people promoting teleconferencing because they had not broken out of their old, deductive thinking mode.

To reiterate, the real power of technology is not that it can make the old processes work better but that it enables organizations to break old rules and create new ways of working — that is, to re-engineer.

In building a brand new facility in which to manufacture its Saturn cars, General Motors Corp. enjoyed the opportunity to re-engineer old work processes without the constraints imposed on it by existing plants.

GM designed the Saturn plant, located in Spring Hill, Tenn., to include an on-line manufacturing database that is accessible by the company's component suppliers. The suppliers do not wait for GM to send them a purchase order; they simply consult the carmaker's production schedule, which is included in the database. Then they take it upon themselves to deliver the appropriate parts to the assembly plant as needed.

In this process, there is no paper — no purchase order and no invoice. After shipping the parts, the vendor sends an electronic message to Saturn saying, in effect, "These are the parts we sent you." When the box of goods arrives, the receiving clerk scans the bar code printed on it with an electronic wand. The computer can then tell the receiving clerk to what part of the plant the goods should go. The scanning also initiates payment to the vendor.

In essence, information technology has enabled Saturn and its supplier to operate as one company, to eliminate overhead in both organizations and to break one of the oldest rules in any corporation's unwritten rule book: Treat vendors as adversaries.

Grab the opportunity

In fact, breaking rules is how we recommend that people learn to think inductively about technology during the re-engineering process: Find the long-standing rule or rules that technology allows the company to break, then see what business opportunities are created by breaking those rules. (See below for some rules technology helps break.)

It is this disruptive power of technology, its ability to break the rules that limit how we conduct our work, that makes technology critical to companies looking for competitive advantage.

Staying on top of new technology and learning how to recognize and incorporate it into an organization must be an ongoing effort — no different from research and development or marketing.

Our view is that if you can buy a technology, it is not new. We subscribe to what might be called the Wayne Gretzky School of Technology. Gretzky, who became the National Hockey League's all-time leading scorer at age 28, was once asked what made him a great hockey player. He was exceptional, he answered, "because I go where the puck is going to be, not where it is."

The same rule applies to technology. Building a strategy around what one can buy in the market today means that a company will always be playing catch-up with competitors that have already anticipated it. Companies that have had great success with applying technology — for instance, Chrysler Corp. with its satellite communications system for helping dealers manage their parts inventories — were asking for the technology they needed well before it appeared on the market. Year after year, Chrysler sent out requests for proposals that outlined what it wanted. When a vendor eventually responded with the needed capabilities, Chrysler was ready to implement. Management knew what rules it wanted to break with the technology before the technology was even at hand.

GM's Saturn plant broke an old rule: Treat vendors as adversaries.

Companies cannot see or read about a new technology today and deploy it tomorrow. It takes time to study it, to understand its significance, to conceptualize its potential uses, to sell those uses inside the company and to plan the deployment. An organization that can execute these preliminaries before the technology actually becomes available will inevitably gain a significant lead on its competition — in many cases, three years or more.

It is entirely possible to stay three years ahead of the market on technology. There does not exist a technology that will become important in 1996 that is not yet demonstrable today. Smart companies can start figuring out how they will use a technology even while its developers are still polishing their prototypes.

As an essential enabler in re-engineering, modern information technology has an importance to the re-engineering process that is difficult to overstate. •

Hammer pioneered the re-engineering concept and is president of Hammer and Co., a management education and consulting firm in Cambridge, Mass. Champy is chairman and chief executive officer at CSC Index, Inc., an international management consulting firm in Cambridge.

RULES are made to be broken. Technology can be the means by which companies smash their old, constraining business processes and transform their operations.

OLD RULE: Information can appear in only one location at one time.
DISRUPTIVE TECHNOLOGY: Shared databases.
NEW RULE: Information can appear simultaneously in as many places as it is needed.

OLD RULE: Only experts can perform complex work.
DISRUPTIVE TECHNOLOGY: Expert systems.
NEW RULE: A generalist can do the work of an expert.

OLD RULE: Businesses must choose between centralization and decentralization.
DISRUPTIVE TECHNOLOGY: Telecommunications networks.
NEW RULE: Businesses can simultaneously reap the benefits of centralization and decentralization.

OLD RULE: Managers make all decisions.
DISRUPTIVE TECHNOLOGY: Decision-support tools (database access, modeling software).
NEW RULE: Decision-making is part of everyone's job.

OLD RULE: Field personnel need offices where they can receive, store, retrieve and transmit information.
DISRUPTIVE TECHNOLOGY: Wireless data communications and portable computers.
NEW RULE: Field personnel can send and receive information wherever they are.

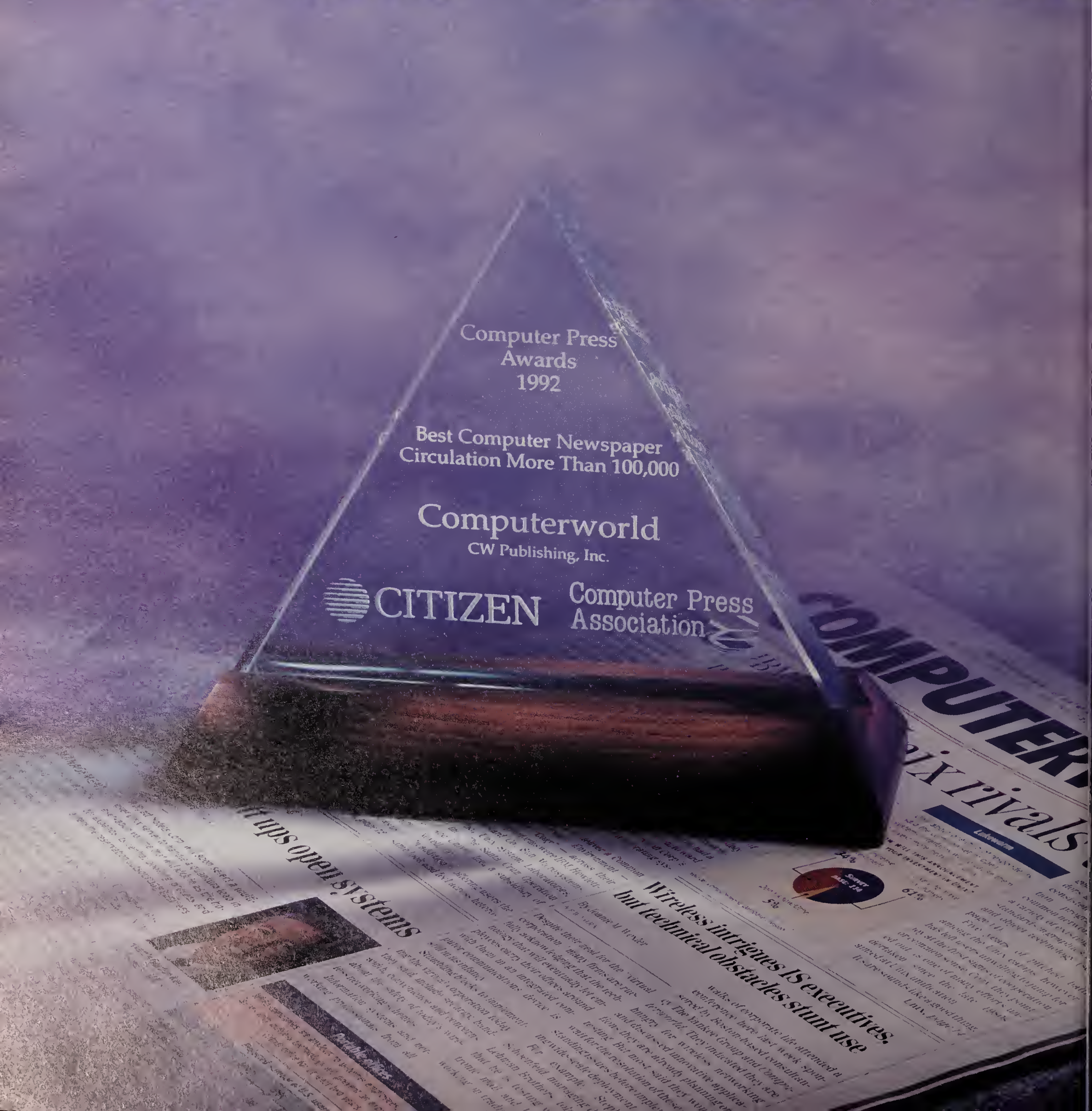
OLD RULE: The best contact with a potential buyer is personal contact.
DISRUPTIVE TECHNOLOGY: Interactive videodisc.
NEW RULE: The best contact with a potential buyer is effective contact.

OLD RULE: You have to find out where things are.
DISRUPTIVE TECHNOLOGY: Automatic identification and tracking technology.
NEW RULE: Things tell you where they are.

OLD RULE: Plans get revised periodically.
DISRUPTIVE TECHNOLOGY: High-performance computing.
NEW RULE: Plans get revised instantaneously.

Source: Michael Hammer and James Champy

61 Reasons Why is the “Best Com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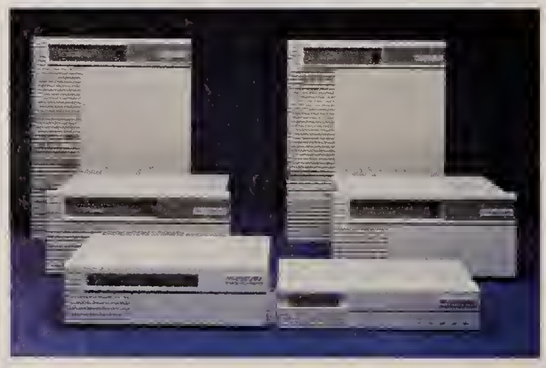

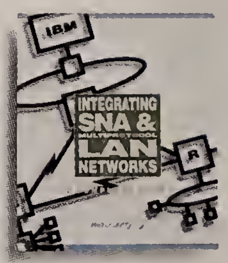

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Training for the client/server leap

By David A. Kelly

IF YOU'RE AN INFORMATION systems professional specializing in mainframes, now is the time to retrain yourself so you won't be left behind when the big machines are unplugged at your company.

The good news is that you can teach yourself many of the skills necessary for a client/server job. Client/server re-engineering experts agree that it's an excellent idea to buy a PC with DOS, Microsoft Corp.'s Windows 3.1 and Windows-based applications.

Experts also say IS professionals interested in making the shift should focus on the following areas:

- **The PC/workstation environment.** "You are dealing with a very complex set of systems, networking and applications software. The managers have to get used to dealing with a wide range of software and hardware," says Majid Naderkhani, assistant vice president of business systems development at Sprint Corp.
- **Servers.** A typical Unix-based server has a host of areas that need professional control: relational database management systems, stored procedures and triggers, network and server operating systems, network gateways, version control and interface maintenance.

- **Open system standards.** Client/server systems require a knowledge of standards — for example: Posix, Government Open Systems Interconnect Profile, SQL and Windows — that are the basis for building portable and interoperable applications. Windows is the entry-level technology to the client/server world, says Peter Minnal, president of Technology Insight Corp., a Marblehead, Mass., consultancy specializing in software re-engineering and client/server tools.
- **RDBMS.** "One of the easiest ways to migrate from mainframes is if you have relational database skills," says George Schussel, chairman of Digital Consulting, Inc., an IS consultancy in Andover, Mass. Schussel's advice is to move away from old-style databases such as VSAM and IMS and to learn SQL-based RDBMSs such as Oracle Corp.'s Oracle 7 and IBM's DB2.
- **Object-oriented techniques.** IS professionals will have to make the change from procedural code to object-oriented code and treat business processes as objects. To do this, Minnal suggests getting involved in Windows and linking Windows applications to become familiar with the techniques.
- **Graphical user interfaces (GUI) and fourth-generation languages (4GL).** Most applications are now being written using a GUI and 4GLs. Schussel suggests learning a GUI such as Windows or IBM's OS/2 2.0 and a 4GL such as Uniface Corp.'s Powerbuilder or Microsoft's Visual Basic.

Kelly is a free-lance writer in West Newton, Mass.

Discard assumptions

Some companies will teach their mainframers the skills they need to take on client/server jobs. Sprint is one such company, according to Majid Naderkhani, assistant vice president of business systems development.

"We found that we really needed the large-system expertise that our mainframers had because the people we hired from the outside didn't understand how all of our systems fit together and the ramifications of the systems they were designing," Naderkhani says.

"But we also found that the experienced mainframe managers did not look at how to implement software in a distributed environment. Instead, they just used assumptions that were valid in the mainframe world. They had to relearn how to make the software operational." —*David A. Kelly*

It can be done

When Standard Commercial Tobacco Corp. in Wilson, N.C., decided to switch three years ago from an IBM 4341 to a client/server environment consisting of Windows 3.1, Powerbuilder 2.0, a NetFrame Systems, Inc. file server, LAN Manager 2.1 and a Sybase, Inc. 4.9 SQL Unix server platform, Frances Williams, software development manager, had to convert her 18 years of mainframe experience into client/server skills.

The move was difficult, but it had its rewards. "Coming from a mainframe background, it was hard to work in the PC environment, with cable problems and network problems and software problems," Williams says. "But once we got oriented, we made a lot of progress."

Williams *made the transition*

Standard Commercial used a team approach to develop its first client/server application. The composition of the transition team — four mainframers and four PC experts — enabled the mainframe professionals to learn client/server fast. "Any time we had problems, we were able to rely on team members with a PC background to help us," Williams says.

Williams adds that the SQL database approach was one of the hardest things for her to learn. Instead of the record-oriented databases she was familiar with, she had to learn new programming techniques to efficiently use the power of the SQL database. But Williams says she finds SQL databases much more powerful than mainframe databases.

The rollout of the first completed application, which took 10 months, was a success. "The users were ecstatic with the graphical approach and the way it looked and worked," she says.

"The big success on the first phase just really convinced everyone that they had made the right decision and encouraged us to continue with the project."

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The employment condition of technology firms involved in the environment has fared well in recent times.
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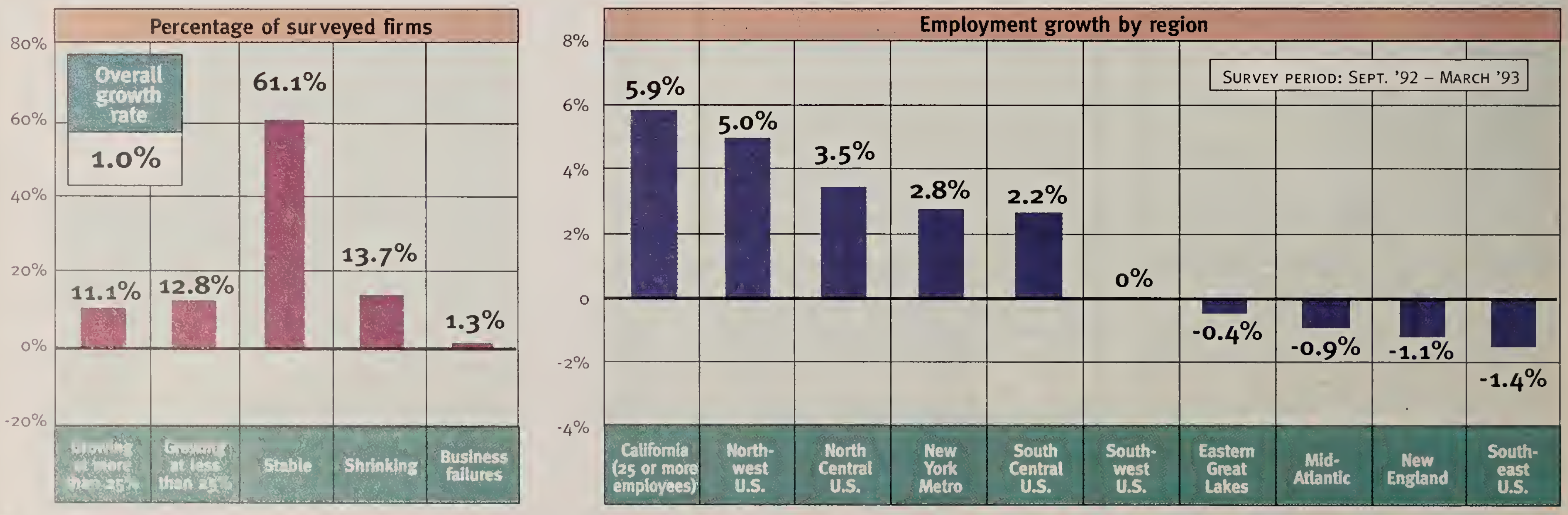

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Household goods and freight carrier business

Movers not exactly shakers

By Joe Panepinto

NEARLY 50 YEARS after Ernest S. Wheaton founded Wheaton Worldwide Van Lines, a $60 million-per-year household goods and freight carrier based in Indianapolis, the company's 300 agents around the country can still ask Ernie what's going on.

Today, however, Ernie is really ERNIE (Electronic Rating Network and Information Exchange), a PC package written in Fox Software, Inc.'s FoxPro by Wheaton's information systems department.

"We built ERNIE to be a little humorous and fun," says Gene Snipes, director of IS at Wheaton. "It has a completely mouse-driven interface that has caricatures of a guy we call Ernie on the screen."

Actually, there may be more than a little method to Wheaton's madness. In the household goods and freight carrier business, IS professionals can expect to run into a healthy dose of computer naivete, if not downright computer phobia. "Lots of people in the moving industry have been in it a long time and have been slow to adapt to computers — lots still have the old adding machines where you punch in numbers and pull the handle down," Snipes jokes.

As a result, IS professionals entering the industry can expect to write applications for a fairly unsophisticated, but increasingly demanding, audience. The primary goal of any development is ease of use.

All of the applications at Wheaton, including ERNIE, the PC-to-Application System/400 interfaces, the electronic-mail system and all AS/400 applications, were written in-house or by contract programmers.

"We try to run pretty lean," Snipes says. "In this era of deregulation, discounts are steep and margins are thin."

Running lean is a reality across the industry. National Van Lines in Broadview, Ill., a $40 million-per-year operation, runs its AS/400-based IS operation with fewer than 20 employees. Mayflower Transit, Inc., the $500 million goods carrier in Indianapolis, has held steady for several years with an IS staff of abut 80.

And at Bekins, the Glendale, Calif.-based carrier, deregulation, the recession and the soft real estate market have forced a 25% reduction in the IS work force during the past five years, from 100 staff members to 75.

This is an industry where support and maintenance are in much greater supply than technological innovation.

"Our industry is not so much interested in being state-of-the-art technologically as it is interested in being cost-effective," says Chuck Berning, director of technology and production services at Mayflower.

Still, some companies are pushing the envelope. At Bekins, IS staff members developed a PC-based system that agents can use as a front end to the company's IBM 3090 series mainframe. Becom (Bekins Communication Package) sends data from the PCs through Timenet in Teletype transactions to a DB2 database running on the mainframe.

IS personnel at Bekins are involved in several functions: Some work in Pascal on the yearly update release of Becom; some work on mainframe application maintenance and support of Cobol; others work on the help desk.

By offering fairly comprehensive help desk services, Bekins is taking a different approach to supporting a user community that "is not the most computer-literate," says Bill Bullington, manager of customer services.

Because moving companies have fairly unsophisticated users, they haven't had the demand for state-of-the-art systems. Most have mainframes with PC applications that they've written themselves, and when they need more specific skills, they call on contractors.

It will be some time before this industry pulls ahead technologywise. IS managers say that in their industry, systems may save money, but they don't move the freight faster.

Panepinto is a free-lance writer in Amherst, Mass.

> "Our industry is not so much interested in being state-of-the art technologically as it is interested in being cost-effective."
>
> *— Chuck Berning, Director of technology and production services Mayflower Transit*

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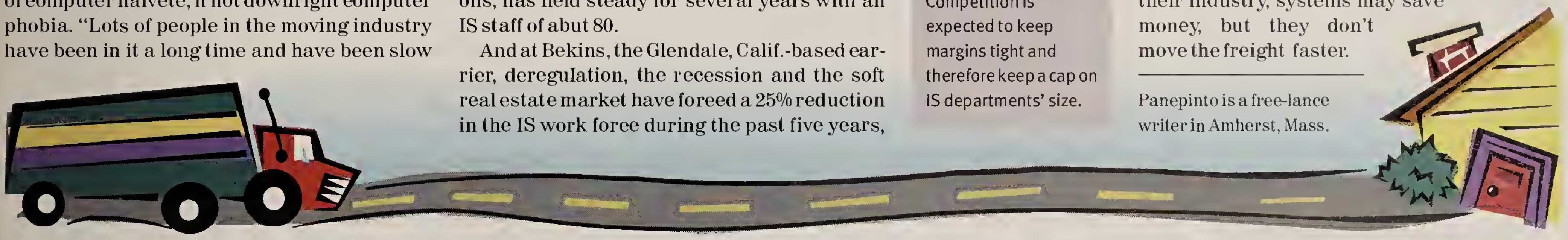
Mainframe skills wanted: Demand still remains high for mainframe operator and Cobol development skills, though many companies need PC-based development skills. Low margins limit new development.

Limited growth: Competition is expected to keep margins tight and therefore keep a cap on IS departments' size.



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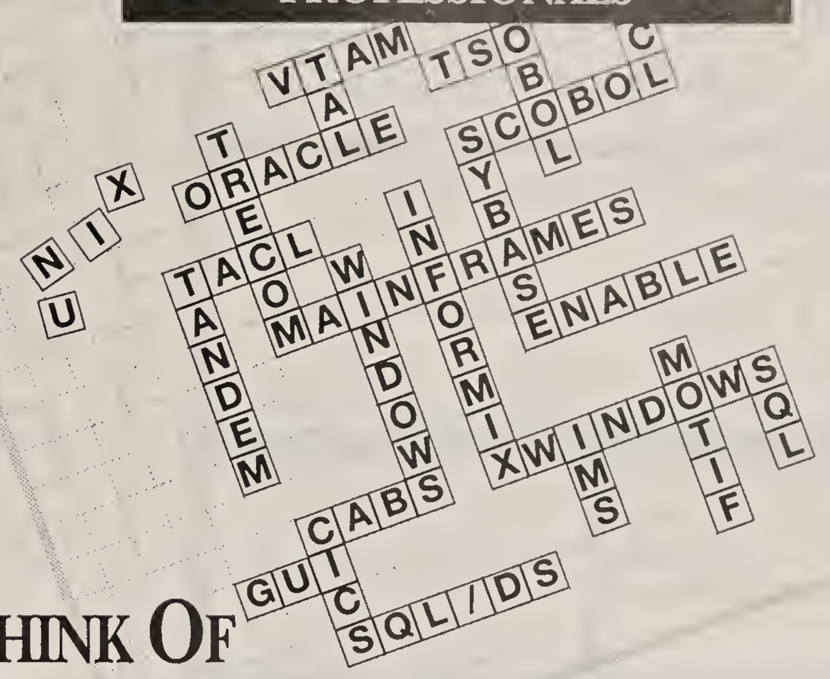

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San Francisco - You'll be responsible for the development, deployment and management of corporate relational databases. This includes project planning, scheduling, resource determination, selection and utilization of appropriate technologies and management of team resources. Projects span platforms from microcomputers to mainframe repositories. Requires 5 years of management experience including 2 as a Project Manager, preferably with relational technology. Dept VT/DBPJL/CW.

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Don't forsake power in negotiations

wheeling & dealing

This is the first in a series of articles that presents negotiating questions asked by information systems purchasers. Joe Auer, president of International Computer Negotiations, Inc., a negotiations, consulting and training firm in Winter Park, Fla., provides the answers.

Q. I evaluated several comparable software products from different vendors and selected one that I thought offered the best solution. The costs looked pretty good because I gave the vendor my budget. I've also informed both management and the end users that I've selected a vendor and have begun the necessary steps to acquire the products.

What's left is to negotiate for favorable contract terms, but the vendor is unwilling to negotiate. The worst part is that almost all of our deals seem to come down to this type of scenario, although it's not necessarily company policy on acquiring new products.

—Director of purchasing at a major corporation

A. Unfortunately, you've lost your power in these negotiations. By telling the vendor you have chosen its product over all the rest and by providing your budget numbers, you have painted yourself into a corner. Now, your only option is to beg for everything.

A tactic you could have considered using is what we call the "zone of consideration" (see story below). To maintain your negotiating position, make vendor selection your last step. The evaluation process is your time to negotiate, and your choice of vendor should be a result of those negotiations.

You need to remember that every move, statement or activity by anyone in your company who interacts with vendors — beginning when the salesperson first appears — will have some impact on the success of your negotiations.

A customer's power is very high during the evaluation stage. When you tell a number of suppliers that you're considering a product, most will do whatever it takes to get your business.

Once a customer selects a vendor, the power is turned over to the vendor and often increases as the customer's commitment grows. If you start negotiating at the last minute, you have no power at all.

NEGOTIATING DILEMMAS

In the middle of negotiating for a computer system and don't know the next move? Have questions about past deals? If yes, we want to help. Phone or fax your questions to Jodie Naze at **Computerworld**, and a negotiating pro will advise you. Call (800) 343-6474, ext. 727, or send a fax to (508) 875-8931.

the zone of consideration

To use the "zone of consideration," you should have an interdisciplinary negotiating team. Although the players change for each deal, the team should typically include a technical person, a contracts person such as a lawyer, individuals from finance and purchasing, a manager of end users and, ideally, someone from management.

When you've narrowed down your vendors, contact two or more of them and say the following:

- You are in the zone of consideration, along with at least one other supplier.
- We will approach each vendor separately; the one with the best deal is probably going to win our business.
- We recommend that someone with sufficient authority from your company always be available.
- Keep in mind that you are still being evaluated. You will be getting plus and minus points for your performance — especially your responsiveness to our financial and contractual concerns.
- When we are ready to negotiate, your score will be lowered if you're unreachable or if we can't find the person responsible for the contracts or someone with the right authority level.
- We believe that your responsiveness is going to be at its highest during the presale period. If you are not responsive now, your responsiveness will only decrease after you get our money.
- Furthermore, we reserve the right to negotiate and complete the deal with anyone in the zone of consideration — at any time. We will do this without "last chances" or notice to anyone. If you don't have your best deal on the table at all times, we might do business with someone else.

Under competitive negotiation like this, prices, contractual warranties and remedies usually improve; however, we don't suggest holding an auction or disclosing one vendor's proposal to another vendor. It's unethical and serves no purpose that can't be accomplished some other way. Vendors may even give a much better price if their competition's offer is unknown.

At some point in this process, one vendor will offer a better deal. Only then do you select your vendor.

What does this approach do for your negotiating position? It gives you a lot of power, and that's the name of the game. — *Joe Auer*

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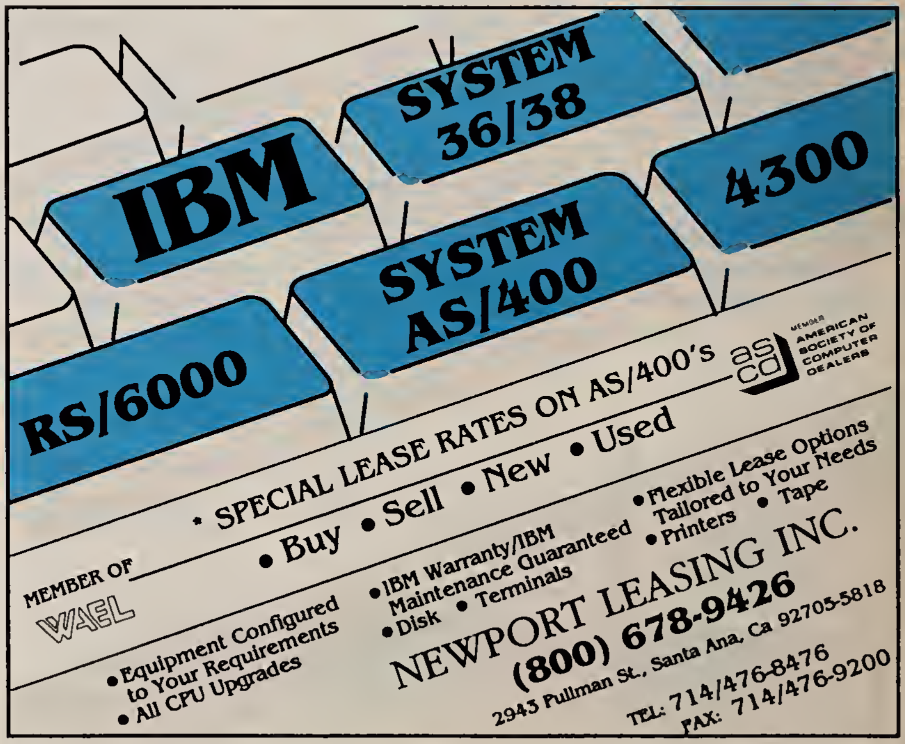

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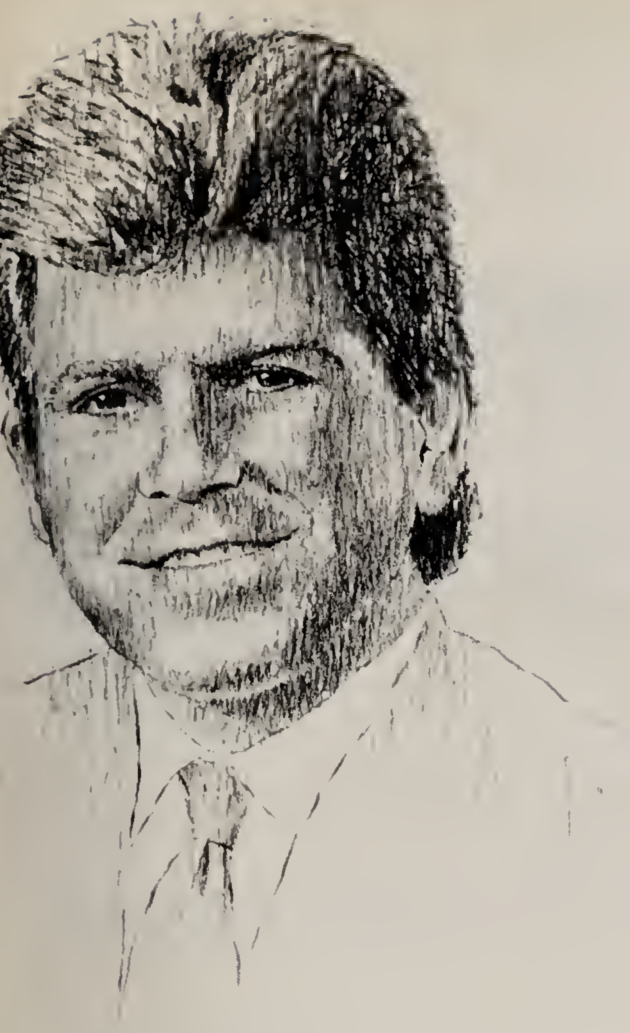

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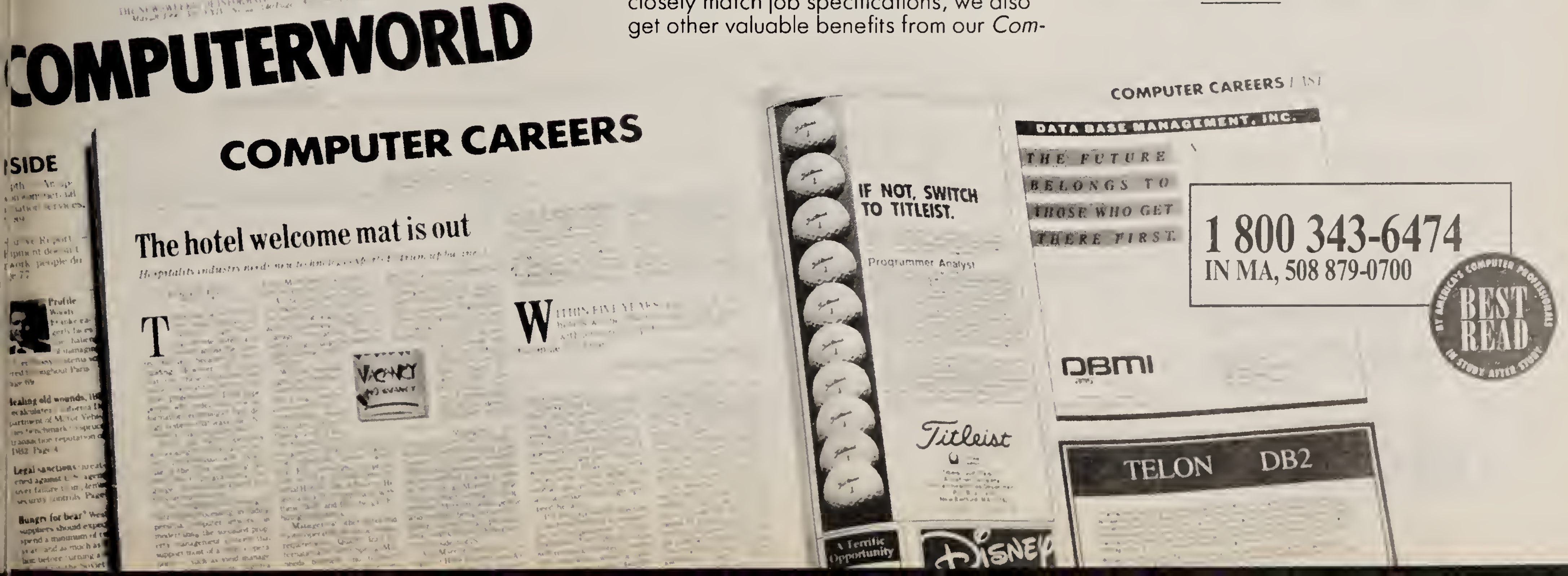
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Friday Stock Ticker

Gainers Losers

Percent

Gainers		Losers	
Adobe Systems Inc.	20.6	Artel Communication Corp.	-17.1
Gandalf Technologies Inc.	19.1	Proteon Inc. (L)	-17.0
ChipSoft	18.8	Digital Systems Int'l Inc. (L)	-16.0
Rasterops	18.2	Compression Labs Inc.	-15.0
Iomega Corp.	17.6	Cirrus Logic (L)	-14.8
Rexon Inc. (L)	16.7	Network General	-13.4
Knowledgeware Inc. (L)	16.7	Amdahl Corp.	-13.0
Cheyenne Software Inc. (H)	15.2	Quarterdeck Office Sys.	-11.8

Dollar

Gainers		Losers	
Adobe Systems Inc.	9.75	Cirrus Logic (L)	-3.13
Matsushita Electronics (H)	6.25	Advanced Micro Devices (H)	-2.75
Synoptics Communications (H)	5.25	Xerox Corp.	-2.25
8MC Software Inc.	4.88	Creative Technologies Inc.	-2.25
Microsoft Corp.	4.25	Policy Management Sys.	-2.25
Intel Corp.	3.75	Paychex	-2.00
Cheyenne Software Inc. (H)	3.50	8anyan Systems Inc.	-2.00
Cabletron Systems	3.50	Autodesk Inc.	-1.88

Industry Almanac

A decent proposal

Leading technology stock analysts answer the question: **If you had $1 million to invest in only one stock, which would you pick?**

William Milton Jr.
Analyst
Brown Brothers Harriman & Co.

"Stratus. The valuation is very low, the earnings comparisons are going to get much better as we move through the year, and street earnings estimates are conservative. I think collapsed sales to IBM and Olivetti have masked some real strengths — there's some momentum there outside of those two.

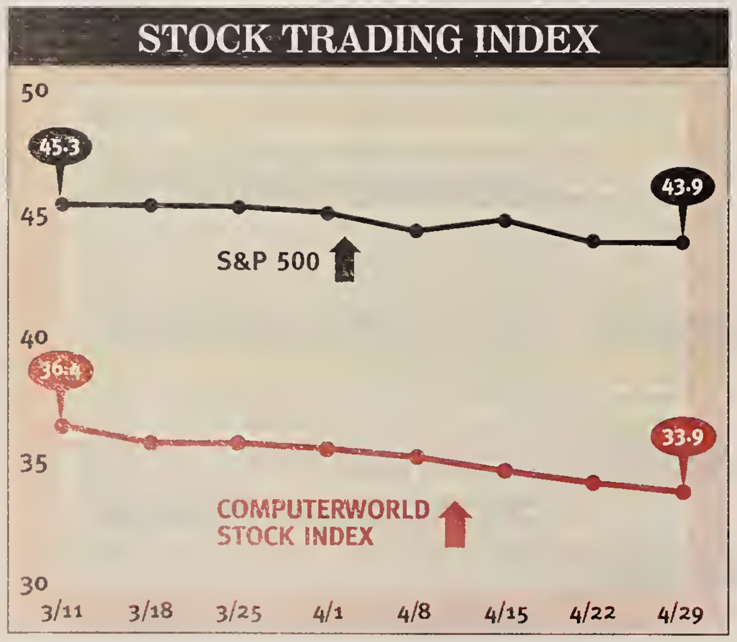
"I'm not looking for a home run, but I think I'd get a single out of it."

Neeraj Vohra
Analyst
Standard & Poor's Corp.

"Long term, there's no way I would put a million dollars in one technology stock. I've seen even large cap stocks move 30% in one day. You get ulcers that way.

"Short term is more interesting. With about a year's turnaround, the top of the list would be Digital, Cray Research or possibly Commodore. Commodore would be a huge long shot, but by December that could be a hot stock."

— Compiled by Derek Slater



COMMUNICATIONS AND NETWORK SERVICES Off 0.0%

Exch	52-Week Range			April30 3 pm	Wk Net Change	Wk Pct Change
OTC	36.75	9.63	3 COM Corp.	32.75	1.88	6.1
NYS	80.25	61.38	American Info Techs Corp.	76.00	-1.13	-1.5
NYS	60.38	40.63	AT&T	56.38	-0.13	-0.2
OTC	3.56	0.75	Artel Communication Corp.	1.81	-0.38	-17.1
OTC	24.50	10.25	8anyan Systems Inc.	15.00	-2.00	-11.8
NYS	56.75	42.38	Bell Atlantic Corp.	51.75	-1.13	-2.1
NYS	57.50	46.75	8ellsouth Corp.	53.75	-0.13	-0.2
NYS	6.25	3.63	8olt, 8eranek & Newman	4.50	-0.13	-2.7
OTC	18.50	9.50	8rooktrout Technology (L)	11.75	1.00	9.3
NYS	93.00	42.13	Cabletron Systems	87.38	3.50	4.2
OTC	34.75	17.75	Chipcom Corp.	32.25	2.50	8.4
OTC	48.25	18.50	Cisco Systems Inc.	43.25	0.75	1.8
OTC	20.50	5.50	Compression Labs Inc.	8.50	-1.50	-15.0
OTC	4.63	0.88	Data Switch Corp.	3.44	0.00	0.0
NYS	22.13	12.75	Digital Comm. Assoc. (L)	12.75	-0.63	-4.7
OTC	12.75	5.25	Digital Systems Int'l Inc. (L)	5.25	-1.00	-16.0
OTC	34.13	4.00	DSC Communications (H)	34.13	2.50	7.9
OTC	9.50	4.75	Fibronix Int'l Inc.	6.50	-0.25	-3.7
OTC	28.50	8.75	Filenet Corp.	10.50	-0.50	-4.5
OTC	4.38	1.50	Gandalf Technologies Inc.	3.50	0.56	19.1
OTC	2.06	0.69	Gateway Communications	1.06	0.00	0.0
NYS	11.50	2.88	General Datacomm Inds.	10.50	1.00	10.5
ASE	4.13	2.00	Go Video	2.19	-0.13	-5.4
NYS	37.75	30.63	GTE Corp.	35.88	1.00	2.9
NYS	84.25	62.50	ITT Corp.	82.13	1.63	2.0
OTC	49.25	29.88	MCI Commmunications Corp.	47.00	-1.00	-2.1
OTC	12.00	2.25	Microcom Inc.	3.50	0.00	0.0
OTC	24.25	4.75	Netrix Corp.	6.00	0.50	9.1
OTC	19.00	8.75	Network Computing Devices	10.50	0.00	0.0
NYS	15.38	5.38	Network Equipment Tech.	6.38	-0.13	-1.9
OTC	23.25	8.00	Network General	8.88	-1.38	-13.4
OTC	15.75	8.63	Network Systems Corp.	9.00	-0.75	-7.7
OTC	64.00	13.63	Newbridge Networks Corp.	61.25	1.25	2.1
NYS	46.00	30.50	Northern Telecom Ltd.	36.75	2.25	6.5
OTC	35.25	22.50	Novell Inc.	30.50	-0.75	-2.4
NYS	92.50	75.00	Nynex Corp.	84.63	-1.88	-2.2
OTC	30.00	14.50	Octel Communications Corp.	20.50	-0.75	-3.5
OTC	6.50	3.38	Penril Data Comm Networks	4.50	0.25	5.9
OTC	40.50	10.25	Picturetel Corp.	21.00	1.75	9.1
OTC	15.25	4.88	Proteon Inc. (L)	4.88	-1.00	-17.0
NYS	30.38	10.16	Scientific Atlanta Inc.	25.88	1.13	4.5
NYS	81.50	59.38	Southwestern 8ell Corp.	77.38	-0.13	-0.2
NYS	33.25	21.00	Sprint Corp.	31.25	-1.88	-5.7
OTC	27.00	8.75	Standard Microsystems Corp	15.00	1.63	12.1
OTC	18.50	6.88	Stratacom Inc.	12.50	0.25	2.0
OTC	111.50	22.75	Synoptics Communications (H)	111.50	5.25	4.9
OTC	7.13	4.25	Telebit Corp.	4.63	0.25	5.7
OTC	9.38	2.13	Telematics Int'l Inc.	6.00	-0.63	-9.4
OTC	25.50	13.38	US Robotics	20.75	1.50	7.8
NYS	45.00	34.38	U S West Inc. (H)	42.63	-0.25	-0.6
OTC	46.50	12.00	Wellfleet Communications	43.25	2.75	6.8
OTC	18.50	7.00	Xircom	9.25	0.00	0.0

PC'S AND WORKSTATIONS Up 1.7%

Exch	52-Week Range			April30 3 pm	Wk Net Change	Wk Pct Change
OTC	7.25	2.50	Advanced Logic Research	2.88	0.00	0.0
OTC	65.25	41.50	Apple Computer Inc.	51.75	2.00	4.0
OTC	24.25	11.25	AST Research Inc.	14.00	0.25	1.8
NYS	12.88	4.25	Commodore Int'l (L)	4.38	-0.13	-2.8
NYS	58.50	23.13	Compaq Computer Corp.	48.38	-1.00	-2.0
OTC	49.88	15.00	Dell Computer Corp.	29.25	0.88	3.1
NYS	82.88	50.25	Hewlett Packard Co.	74.25	0.88	1.2
NYS	33.50	16.13	Silicon Graphics	33.50	1.63	5.1
OTC	41.00	22.50	Sun Microsystems Inc.	27.25	1.25	4.8
NYS	32.13	22.25	Tandy Corp.	29.63	0.88	3.0
OTC	11.00	2.75	Zeos International Ltd.	4.38	0.00	0.0

LARGE SYSTEMS Up 0.2%

Exch	52-Week Range			April30 3 pm	Wk Net Change	Wk Pct Change
ASE	18.38	5.00	Amdahl Corp.	5.00	-0.75	-13.0
NYS	9.75	4.25	Convex Computer	5.13	0.38	7.9
OTC	6.13	1.88	Cray Computer	2.50	-0.25	-9.1
NYS	39.75	19.00	Cray Research Inc.	28.63	-0.13	-0.4
NYS	13.88	7.13	Data General Corp.	9.50	0.13	1.3
NYS	49.25	30.38	Digital Equipment Corp.	44.00	0.63	1.4
NYS	38.63	26.63	Harris Corp.	36.63	-0.25	-0.7
NYS	100.38	45.88	I8M	49.00	1.00	2.1
OTC	22.00	5.50	Kendall Square Research	15.50	1.00	6.9
NYS	125.50	83.00	Matsushita Electronics (H)	125.50	6.25	5.2
OTC	17.00	6.00	Pyramid Technology	14.63	1.00	7.3
OTC	24.00	11.13	Sequent Computer Sys.	19.25	0.50	2.7
OTC	16.38	1.38	Sequoia Systems Inc.	2.00	-0.25	-11.1
NYS	48.38	29.50	Stratus Computer Inc.	33.50	-0.13	-0.4
NYS	16.88	9.88	Tandem Computers Inc.	10.88	0.13	1.2
NYS	13.88	7.75	Unisys Corp.	11.75	0.25	2.2
ASE	4.13	0.06	Wang Labs Inc. (B)	0.50	0.00	0.0

SOFTWARE Up 1.5%

Exch	52-Week Range			April30 3 pm	Wk Net Change	Wk Pct Change
OTC	57.00	25.25	Adobe Systems Inc.	57.00	9.75	20.6
OTC	22.25	10.25	Aldus Corp.	14.50	-1.38	-8.7
OTC	16.63	5.63	American Software Inc.	6.00	-0.38	-5.9
OTC	28.13	9.75	Ask Computer Systems	11.00	0.00	0.0
OTC	56.50	29.75	Autodesk Inc.	40.25	-1.88	-4.5
OTC	15.00	2.50	8achman Info. Systems (L)	2.88	0.25	9.5
OTC	43.00	34.75	8GS Systems Inc.	36.50	-0.50	-1.4
OTC	84.13	37.25	8MC Software Inc.	50.13	4.88	10.8
OTC	28.25	17.00	8oole & 8abbage	22.75	-1.50	-6.2
OTC	54.50	17.50	8orland Int'l Inc.	22.75	0.25	1.1
OTC	6.50	3.00	CE Software	3.13	-0.25	-7.4
ASE	26.50	6.25	Cheyenne Software Inc. (H)	26.50	3.50	15.2
OTC	19.50	8.25	ChipSoft	11.88	1.88	18.8
OTC	9.75	5.63	Cognos Inc.	6.50	-0.13	-1.9
NYS	27.38	10.88	Computer Associates	23.13	0.13	0.5
NYS	12.38	2.75	Computervision Corp. (L)	3.13	-0.25	-7.4
OTC	34.25	19.25	Compuware Corp.	24.75	1.50	6.5
OTC	14.75	5.75	Comshare Inc. (L)	6.50	-0.25	-3.7
OTC	17.25	10.75	Corel Corp.	14.25	0.63	4.6
OTC	29.25	6.00	Easel Corp.	7.00	0.50	7.7
OTC	25.25	12.00	4th Dimension	17.75	-1.25	-6.6
OTC	20.25	6.00	Frame Technology (L)	6.75	0.25	3.8
OTC	20.75	10.50	Group I Software	12.00	-1.00	-7.7
OTC	35.25	19.50	Gupta	20.50	-0.50	-2.4
OTC	8.75	3.50	Hogan Systems Inc.	7.38	0.38	5.4
OTC	25.75	11.25	IMRS	14.50	-0.75	-4.9
OTC	34.75	18.50	Information Resources	31.25	2.50	8.7
OTC	42.00	12.13	Informix Corp.	36.50	2.88	8.6
OTC	17.75	9.50	Intergraph Corp. (L)	10.25	0.00	0.0
OTC	13.63	7.75	Interleaf Inc.	8.25	-1.00	-10.8
OTC	18.00	6.75	Intersolv Inc.	7.50	0.00	0.0
OTC	16.00	8.25	Knowledgeware Inc. (L)	9.63	1.38	16.7
OTC	54.75	26.25	Legent Corp. (L)	29.50	1.75	6.3
OTC	33.25	14.75	Lotus Development	25.75	1.00	4.0
OTC	23.00	7.75	MathSoft	10.25	0.50	5.1
OTC	23.25	5.25	McAfee Associates	7.75	0.25	3.3
OTC	11.63	1.88	Meca Software	11.13	-0.25	-2.2
OTC	15.00	5.25	Mentor Graphics	9.13	0.38	4.3
OTC	46.00	27.25	Micro Focus	32.00	0.00	0.0
OTC	19.00	4.38	Micrografx Inc.	4.63	-0.25	-5.1
OTC	95.00	65.50	Microsoft Corp.	86.25	4.25	5.2
OTC	37.50	14.00	Oracle Corp.	35.63	1.88	5.6
OTC	31.88	15.38	Parametric Technology	27.50	1.75	6.8
OTC	40.50	22.50	Peoplesoft	30.75	1.50	5.1
OTC	9.50	3.50	Phoenix Technologies	5.25	0.38	7.7
OTC	40.00	28.25	Powersoft (L)	28.25	-1.00	-3.4
OTC	25.00	11.25	Platinum Technology	13.75	0.75	5.8
OTC	61.50	29.00	Progress Software Corp.	37.50	2.25	6.4
OTC	17.50	2.94	Quarterdeck Office Sys.	3.28	-0.44	-11.8
OTC	24.50	11.75	Rainbow Technologies Inc.	20.00	-0.75	-3.6
OTC	16.00	4.00	Rasterops	6.50	1.00	18.2
OTC	15.25	3.63	Ross Systems	10.75	-0.75	-6.5
OTC	27.25	8.50	Sapiens USA Inc.	24.50	-1.25	-4.9
OTC	19.50	6.75	Software Publishing Corp.	7.50	-0.50	-6.3
OTC	9.13	2.00	Software Toolworks Inc.	7.50	-0.25	-3.2
OTC	4.88	0.75	Spinnaker Software	1.63	0.13	8.3
OTC	12.75	3.25	State of the Art	9.13	-0.63	-6.4
NYS	24.63	13.75	Sterling Software Inc.	19.75	-0.38	-1.9
OTC	18.75	8.00	Struct. Dynamics Research	15.25	-1.25	-7.6
OTC	62.25	21.00	Sybase Inc.	57.88	1.88	3.3
OTC	44.25	5.88	Symantec Corp.	12.88	-0.25	-1.9
NYS	12.50	5.25	Systems Center Inc.	10.25	-0.25	-2.4
OTC	25.50	10.00	System Software Assoc.	12.50	-0.25	-2.0
OTC	7.75	2.50	Trinzic Corp.	3.88	0.00	0.0
OTC	22.75	9.13	ViewLogic Systems	14.88	-0.38	-2.5
OTC	23.50	6.75	Walker Interactive Systems	7.25	0.50	7.4
OTC	3.19	1.38	Wordstar	2.38	0.25	11.8

SEMICONDUCTORS Off 1.0%

Exch	52-Week Range			April30 3 pm	Wk Net Change	Wk Pct Change
NYS	32.88	7.38	Advanced Micro Devices (H)	28.25	-2.75	-8.9
NYS	21.38	9.00	Analog Devices Inc.	19.13	1.13	6.3
OTC	20.75	7.63	Atmel Corp.	19.25	-0.88	-4.3
OTC	9.38	2.75	Chips and Technologies	3.06	-0.19	-5.8
OTC	39.75	13.00	Cirrus Logic (L)	18.00	-3.13	-14.8
NYS	12.38	7.38	Cypress Semiconductor Corp	10.38	0.13	1.2
NYS	16.13	7.50	Dallas Semiconductor	13.13	0.50	4.0
OTC	121.25	46.50	Intel Corp.	96.75	3.75	4.0
NYS	14.13	4.88	LSI Logic Corp.	11.00	-0.75	-6.4
NYS	28.50	13.13	Micron Technology	23.13	0.75	3.4
NYS	74.88	37.13	Motorola Inc.	73.38	2.00	2.8
NYS	14.13	8.50	National Semiconductor	13.00	0.63	5.1
OTC	18.50	6.75	Sierra Semiconductor (L)	7.50	0.25	3.4
OTC	38.50	22.25	SynOpsys	34.75	-0.50	-1.4
NYS	63.38	32.25	Texas Instruments	57.25	1.63	2.9
OTC	8.88	6.00	VLSI Technology	6.75	-0.38	-5.3
OTC	7.63	2.13	Weitek	6.25	0.00	0.0
ASE	9.63	4.13	Western Digital Corp.	4.75	-0.13	-2.6
OTC	37.50	14.50	Xilinx	32.00	-1.13	-3.4
OTC	27.84	12.50	Zilog Inc.	25.25	0.00	0.0

PERIPHERALS AND SUBSYSTEMS Up 1.2%

Exch	52-Week Range			April30 3 pm	Wk Net Change	Wk Pct Change
OTC	33.75	11.75	American Power Conversion	26.75	-0.88	-3.2
OTC	20.16	13.66	8anctec Inc.	19.25	1.00	5.5
OTC	18.00	6.25	Cambex Corp.	7.50	0.25	3.4
ASE	18.38	6.50	Cognitronics Corp.	7.50	0.00	0.0
NYS	25.50	12.38	Conner Peripherals	12.38	-0.75	-5.7
OTC	38.50	10.75	Creative Technologies Inc.	26.00	-2.25	-8.0
OTC	30.75	14.25	Data Race Inc.	20.00	0.50	2.6
ASE	17.00	4.75	Dataram Corp.	9.25	0.25	2.8
NYS	31.50	8.66	EMC Corp. (H)	31.50	2.75	9.6
OTC	10.50	5.38	Emulex Corp.	6.63	-0.75	-10.2
OTC	19.00	13.25	Evans & Sutherland	16.63	0.75	4.7
OTC	38.25	12.00	Exabyte	13.00	-0.63	-4.6
OTC	26.00	7.09	Intelligent Info. Systems	22.25	-1.25	-5.3
OTC	8.88	3.88	Iomega Corp.	5.00	0.75	17.6
OTC	23.00	5.75	IPL Systems Inc.	7.25	0.25	3.6
OTC	24.00	10.75	Komag Inc.	17.25	1.00	6.2
OTC	19.63	5.88	Maxtor Corp. (L)	6.25	-0.50	-7.4
OTC	11.75	5.75	Micropolis Corp.	6.50	0.13	2.0
NYS	116.00	92.75	3M Corp	112.25	-0.88	-0.8
OTC	7.75	4.00	Printronix Inc.	7.38	0.38	5.4
NYS	17.25	6.88	QMS Inc. (H)	14.75	-1.75	-10.6
OTC	17.88	11.63	Quantum Corp.	13.75	0.75	5.8
OTC	12.75	3.38	Radius Inc. (L)	4.13	0.31	8.2
NYS	16.25	7.50	Recognition Equipment	13.50	0.38	2.9
OTC	13.88	5.00	Rexon Inc. (L)	6.13	0.88	16.7
OTC	22.38	12.00	Seagate Technology	15.00	-0.38	-2.4
NYS	49.50	18.00	Storage Technology	27.75	0.63	2.3
NYS	27.88	16.88	Tektronix Inc.	25.38	-1.13	-4.2
NYS	88.88	66.75	Xerox Corp.	76.63	-2.25	-2.9

SERVICES Off 0.4%

Exch	52-Week Range			April30 3 pm	Wk Net Change	Wk Pct Change
OTC	23.50	12.66	American Mgmt. Systems	18.50	-0.63	-3.3
NYS	4.75	3.00	Anacomp Inc.	3.50	0.00	0.0
OTC	35.75	16.25	Analysts Int'l	26.50	0.75	2.9
NYS	56.13	38.75	Auto Data Processing	49.50	1.63	3.4
NYS	17.25	9.41	Ceridian Corp.	14.75	-0.38	-2.5
NYS	17.38	13.13	Comdisco Inc.	15.50	0.13	0.8
OTC	8.00	4.50	Computer Horizons	7.50	-0.25	-3.2
NYS	80.50	57.00	Computer Sciences	73.13	2.50	3.5
NYS	9.63	6.88	Computer Task Group	7.25	0.38	5.5
NYS	40.50	22.00	CompUSA Inc.	29.88	0.88	3.0
OTC	17.50	6.00	Corporate Software	11.00	-1.00	-8.3
OTC	25.50	7.38	Egghead Discount Software	8.38	-0.25	-2.9
NYS	35.88	25.25	General Motors E (EDS)	31.38	-1.75	-5.3
OTC	25.50	9.25	Inacom Corp.	16.13	-1.00	-5.8
OTC	15.38	6.25	Intelligent Electronics	13.63	0.38	2.8
OTC	14.38	6.63	Merisel	10.50	0.63	6.3
OTC	14.75	5.75	Microage Inc.	13.25	0.25	1.9
OTC	43.00	21.75	Paychex	38.75	-2.00	-4.9
NYS	87.25	37.00	Policy Management Sys.	40.13	-2.25	-5.3
NYS	35.38	16.81	Reynolds and Reynolds	34.50	1.63	4.9
OTC	31.75	22.00	SEI Corp.	28.50	0.25	0.9
OTC	24.38	16.88	Shared Medical Systems	20.38	0.38	1.9
OTC	13.88	5.75	SHL Systemhouse	11.00	0.00	0.0
OTC	29.25	18.25	Software Spectrum Inc.	23.38	-0.13	-0.5
OTC	33.75	22.25	Sungard Data Systems	28.88	-1.88	-6.1
NYS	4.00	1.13	Ultimate Corp.	3.25	0.00	0.0

KEY: (H) = New annual high reached in period (L) = New annual low reached in period
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Sybase sets its own direction

Early adopter of client/server sets sights on enterprise computing

By Jean S. Bozman
EMERYVILLE, CALIF.

Until recently, Sybase, Inc. was the small database firm preaching the virtues of client/server computing. Few understood its message, and most of the market was flocking to rival Oracle Corp., which was doubling in size every year. But the 6-year-old company has recently undergone a rapid growth spurt fueled in turn by growing interest in the notion of client/server computing.

These days, Sybase is trying to boost its growth further by attempting to gain a technology edge with System 10, its upcoming SQL Server database for enterprise computing (see story page 8).

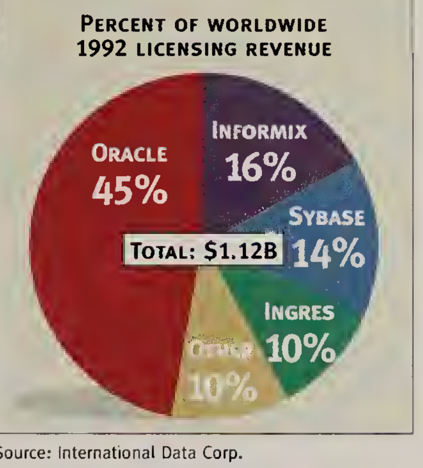
As it tries to break out of the pack led by Oracle, $265 million Sybase is following its own agenda, much as it did in 1987 when it shipped its first "client/server" database.

"Sybase has always been known for blazing their own technology path and not necessarily following the rest of the industry," said Peter Kastner, a vice president at Aberdeen Group in Boston. "Clearly, they can differentiate themselves by finding a better model for distributed enterprise computing, and that's what they believe they've got with System 10."

Announced in November, System 10 will compete directly with the Oracle 7 distributed database, analysts said. Its enhanced Sybase SQL Server 4.9 database engine will be strengthened by software utilities that handle backup and recovery, distributed updates and console management. System 10's first module, the OmniSQL Gateway, shipped in April. Most System 10 modules are in beta-test sites and will ship sometime later in the year, said Marketing Vice President Stewart Schuster.

Playing catch-up

Sybase hopes its next-generation database will help it close the gap with Oracle



Source: International Data Corp.

Impressive features

Longtime Sybase users cited greater reliability, performance and backup as System 10's top attractions.

"The Replication Server would be high on our list because our bank distributes data globally," said Robert Kunimura, executive director of information technology at Swiss Bank Corp. in Chicago.

But Sybase could stumble yet. Users attending the fifth annual Sybase user conference in San Jose, Calif., last week said advanced server technology is incomplete without advanced development tools. Industry analysts said Sybase's Achilles' heel is its lack of a cohesive tool set: Some users have likened the current array of Sybase tools to a smorgasbord of unrelated products.

Users had criticized the firm's homegrown APT Workbench tools in recent years, prompting Sybase to enhance APT. In search of better tools, Sybase bought SQL Solutions, Inc. in Burlington, Mass., in January 1990; Deft, Inc. in Toronto in 1991; and Gain Technology, Inc. in Palo Alto, Calif., in 1992.

Tom Arnold, manager of information architecture at Silicon Graphics, Inc. in Mountain View, Calif., said he wants to see an integrated Sybase tool set — and soon. "It would be great if all my core applications were constructed with the same tool kit," Arnold said. Silicon Graphics uses a mix of Sybase tools and independent tools to support 200 SQL Server databases on its corporate network, he said.

Analysts said Sybase must regain strength in tools if it is to stay successful. Otherwise, users will continue to choose tools from other vendors, including those made by database rivals. A comprehensive tools announcement is planned for June, Schuster said.

Sybase recorded 65% growth in 1992, ending the year with $265 million in revenue. In contrast, giant Oracle's sales were relatively flat at about $1.1 billion. Sybase's user base doubled to 7,000-plus sites last year, including many that are rewriting mainframe applications to run on Unix, OS/2 or Novell, Inc. NetWare servers.

Divvying up the database pie

Even if Sybase is successful with System 10, it probably will not take significant market share from Oracle. That is because Oracle is much larger and has just fielded its Oracle 7 distributed database, analysts said.

Instead, Sybase — which analysts said they expect to reach the $400 million in sales mark by 1994 — is growing alongside the expanding client/server market and the trend toward downsizing.

The database maker is aided by two big business partners — Microsoft Corp. and IBM — in its efforts to gain marketing clout and find new accounts.

Sybase is vying for market share with two like-size rivals, The ASK Group, Inc.'s $283 million Ingres Products Division and $254 million Informix Software, Inc.

To continue growing, Sybase not only needs to strengthen its tool strategy (see story at left), but it must work to improve customer support and absorb hundreds of new employees, some of whom have joined the company as a result of several acquisitions.

"It's fair to say that 100 people a month are joining Sybase," said David Peterschmidt, vice president and general manager of worldwide field operations.

In the fourth quarter of 1992, there were 1,500 employees; now, there are 2,100.

As a telling sign of that change, Sybase recently revamped worldwide customer support, tripling the number of U.S. support personnel.

— *Jean S. Bozman*

First-quarter earnings, calendar 1993

Company	Revenue January through March	Percent change from 1992	Net income January through March	Percent change from 1992
Amdahl Corp.	$380.7M	(24)%	$(239.7)M	NM*
Banyan Systems, Inc.	$30.3M	12%	$2.8M	72%
Borland International, Inc.	$117.1M	0.2%	$5.1M	119%
Comdisco, Inc.	$530M	(1)%	$19M	154%
Control Data Systems, Inc.	$102.7M	(13)%	$1.3M	120%
Creidian Corp.	$224.4M	9%	$12.9M	138%
Electronic Data Systems Corp.	$2.07B	4%	$151.4M	14%
Parallan Computer, Inc.	$6.4M	1,280%	$2.8M	413%
Pyramid Technology Corp.	$58M	34%	$1.4M	120%
Sequent Computer Systems, Inc.	$77.6M	20%	$3.4M	253%
Symantec Corp.	$51.3M	(19)%	$(1.4)M	NM*
Tricord Systems, Inc.	$13.7M	111%	$846,000	162%

* Not meaningful

Earnings all over the map

Mainframe vendors continued to wonder whether their ever-shrinking market would improve, while open client/server systems vendors enjoyed success and growth during the first quarter of calendar 1993. PC software vendors offered mixed results.

Amdahl Corp.'s first-quarter loss was dramatically larger than anticipated, as Amdahl's new line, introduced in February, caused users to push back purchase decisions pending product evaluations. Amdahl's first-quarter loss also included charges associated with reductions in its work force and manufacturing capacity.

Sequent Computer Systems, Inc. more than tripled its net income from the corresponding quarter in 1992. This reflects the company's direct end-user business strength, which grew 45%, from $49.1 million to $71.4 million, and accounted for 92% of the quarter's total revenue.

Borland International, Inc. ended 1993 with a net loss of $49.2 million compared with a net loss of $110.4 million in fiscal 1992. Fiscal fourth-quarter sales increased only 0.2%, although profits rose 119%. The quarter's success was chiefly fueled by the release of Paradox for Windows and sales of Quattro Pro for Windows, but the fiscal-year loss could not be offset by the Windows packages' low retail prices. — *Kevin Burden*

Wysiwyg

Computer Love Song

By Christine Tabak

Enter host.
Unauthorized access
Is prohibited today.
Last interactive log in
Resulted in required
Separation,
Invariably too long.
Receiving file
In progress.
Number of retries?
Last message. . .
Bytes transferred.
Finished.
Logged out at port 7.
No carrier.
Please,
Log in.

Hidden features

▶ To get a Microsoft Access developers list: Load Access and create an Access table. Save it as Cirrus. Hold down the shift and control keys. Then select Help "About MS Access." Put cursor on the key icon on the Help screen. Double click the right mouse button. You'll see storm clouds shooting lightning that destroys a "pair of ducks" and then lists the teams involved in development, marketing and so on.

GREAT NAMES

Frosti Bergsson
General Manager
High Performance Systems Ltd.,
Reykjavik, Iceland

When this rep comes calling — RUN

In the action thriller *Point of No Return* (Warner Brothers), Bridget Fonda's character is a trained assassin whose cover is that of a sales rep for an actual hardware company in Sunnyvale, Calif. — SuperMac Technology.

Source: *ID Systems* magazine, February 1993

The Fifth Wave *by* Rich Tennant

©RICHTENNANT
It's chaos, but it's chaos that works.

Inside Lines

Another swing of the Pentium

Intel's much-awaited 66-MHz Pentium microprocessor has been tested internally to run upward of 112 MIPS — or more than twice the processing power of the 54 MIPS I486-class chips, according to Daniel Hoskins, an Intel architectural manager. Hoskins, who spoke at Unisys' Cube and Use user group conference last week, said the next-generation Pentium 6 chip, which will incorporate 8 million to 10 million transistors, is less than 18 months from delivery. The Pentium 7, which boasts 16 million to 20 million transistors, is already under development. Intel's goal, Hoskins said, is to deliver a 2 billion instructions per second chip to market by the year 2000.

Gang way

IBM PC Co. is gearing up for announcements of PS/2 upgrades and new PS/1s in the middle of this month. PS/1s will now come with a local bus, while the PS/2s will get Pentium processor upgrade cards for the Models 90, 95, 195 and 295. Compaq, Dell, NCR, NEC and Advanced Logic Research, among others, will have fully Pentium-ready boxes on the 17th of the month. IBM-bashers may have to bite their tongues this time, though, as mid-June will bring completely revamped PS/2s, with local-bus graphics, on-board network adapters and application-specific digital signal processors, according to sources. June will also bring IBM's Green PC.

Now you see it, now you don't

Almost lost in the shuffle after a judge gave AMD a reprieve in its court fight with Intel was AMD's new DX2 part. "AMD has a DX2 part now, and they didn't have one last Comdex," said Dean McCarron, analyst at MicroDesign Resources in Scottsdale, Ariz. "The DX2 was part of Intel's strategy to get away from the cloners. So what this means is that AMD now has Intel's cash cow in its product line." Of course, it won't matter until sometime in 1994, when AMD begins shipping it in volume.

A UNITE-ed User Group?

Unisys customers who are members of the Use (former Sperry users) and Cube (Burroughs shops) user groups may finally be nearing a vote on combining the organizations. Panel members representing both Use and Cube have drawn up bylaws and a proposed structure for the new group, which would aptly be named Unite, or Unisys Information and Technology Exchange. Panel members said the ballots will be sent to Use and Cube members this summer, tallied by an independent auditor and decided on by the fall conference.

Fear and loathing

DEC is raising the bar for its commission-based sales force, which is expected to go into action this summer. The company will weed out those sales reps making less than $75,000 to $100,000. Meanwhile, DEC is designing a special June incentive plan to help reps earn extra revenue: a commission of 1% will be given to those closing deals of $1 million or more, the sources said.

Party crasher

KnowledgeWare will continue a push into the cramped client/server arena with GUI-builders for Unix and Windows, confirmed Mike Ryan, chief technology officer. Beta-test versions of CWS-GUI for Windows are going out this quarter; the third quarter is the target for the Unix tool, Ryan said.

While authorities in the U.S. continue to define the penalties for computer-related crimes, it appears China has settled on its punishment: execution. According to a Reuter news report, Shi Biao, who worked at the state-run Agricultural Bank of China, was executed by gunshot late last month after being found guilty of embezzling $175,000 via computer. It is the country's first publicized case of computer fraud. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's *24-hour voice-mail tip line at (508) 820-8555.*

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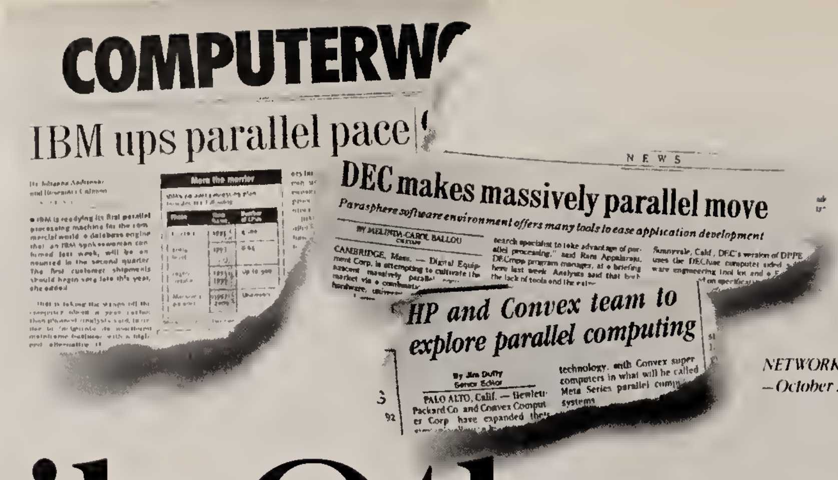


COMPUTERW

IBM ups parallel pace

NEWS

DEC makes massively parallel move

Parasphere software environment offers many tools to ease application development

BY MELINDA-CAROL BALLOU

HP and Convex team to explore parallel computing

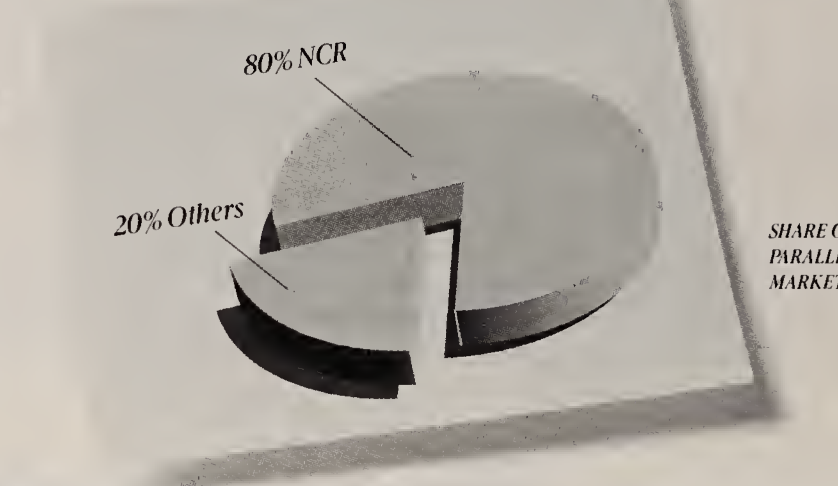
By Jim Duffy

COMPUTERWORLD
–January 18, 1993

COMPUTERWORLD
–October 12, 1992

NETWORK WORLD
–October 26, 1992

While Others Are Developing A Strategy, We've Developed A Following.



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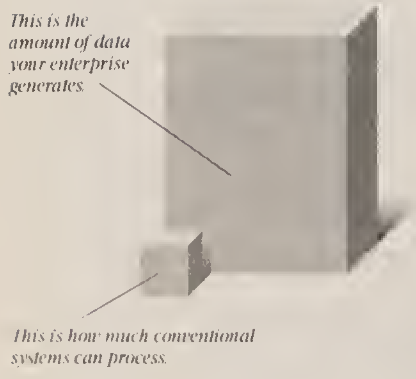
OUR ENTERPRISE SYSTEMS CAN PROCESS THE CRITICAL DATA YOUR ENTERPRISE GENERATES.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This is how much conventional systems can process.

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